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CONTAMINATION ASSESSMENT REPORT SITE 3810N NAS PENSACOLA FL  
9/1/1992  
ABB ENVIRONMENTAL SERVICES, INC

# **CONTAMINATION ASSESSMENT REPORT**

**SITE 3810N  
NAVAL AVIATION DEPOT  
NAVAL AIR STATION  
PENSACOLA, FLORIDA**

**UIC: N00204**

**Contract No. N62467-89-D-0317**

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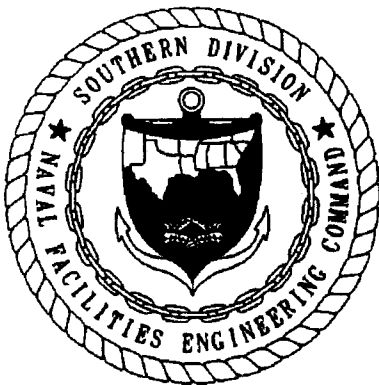
**September 1992**



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## FOREWORD

Subtitle I of the Hazardous and Solid Waste Amendments (HSWA) of 1984 to the Solid Waste Disposal Act (SWDA) of 1965 established a national regulatory program for managing underground storage tanks (USTs) containing hazardous materials, especially petroleum products. Hazardous wastes stored in USTs were already regulated under the Resource Conservation and Recovery Act (RCRA) of 1976, which was also an amendment to SWDA. Subtitle I requires that the U.S. Environmental Protection Agency (USEPA) promulgate UST regulations. The program was designed to be administered by the individual States, who were allowed to develop more stringent standards, but not less stringent standards. Local governments were permitted to establish regulatory programs and standards that are more stringent, but not less stringent than either State or Federal regulations. The USEPA UST regulations are found in the Code of Federal Regulations, Title 40, Part 280 (40 CFR 280) (*Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks*) and Title 40, Part 281 (*Approval of State Underground Storage Tank Programs*). Title 40, Part 280 was revised and published on September 23, 1988, and became effective December 22, 1988.

The Navy's UST program policy is to comply with all Federal, State, and local regulations pertaining to USTs. This report was prepared to satisfy the requirements of the Florida Department of Environmental Regulation (FDER) Chapter 17-770, Florida Administrative Code (FAC) (*State Underground Petroleum Environmental Response*) regulations on petroleum contamination in Florida's environment as a result of spills or leaking tanks or piping.

Questions regarding this report should be addressed to the Environmental Coordinator, Naval Aviation Depot (NADEP), Naval Air Station, Pensacola, Florida, at 904-452-2320, or to Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Code 1843, at DSN 563-0613 or 803-743-0613.

## EXECUTIVE SUMMARY

During an underground storage tank (UST) removal program conducted by the U.S. Department of the Navy in 1989 and 1990, 18 sites at the Naval Aviation Depot (NADEP), Naval Air Station, Pensacola, Florida, were identified as having soil contamination exceeding State target levels for total recoverable petroleum hydrocarbons (TRPH). ABB Environmental Services, Inc. (ABB-ES), was contracted by Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform a contamination assessment (CA) for each of the 18 sites.

Site 3810N is the former location of a 500-gallon fuel oil UST. The UST was installed in 1982 on the north side of building 3810. It was replaced with a 500-gallon aboveground tank in 1990, located approximately 15 feet northwest of the former UST. The aboveground tank was removed from the site during the period of this investigation.

Nineteen soil borings and 12 monitoring wells were placed at the site during the CA to assess the degree and extent of soil and groundwater contamination. Groundwater samples were collected and analyzed for appropriate parameters on two separate occasions, February 5 and April 23, 1992. The April 23, 1992, samples were collected and analyzed to verify the concentrations of contaminants detected in the February 5, 1992, samples and to also assess the contamination in samples collected from two additional monitoring wells installed after the February 5, 1992, sampling event. Monitoring well locations are shown in the Executive Summary Figure. The findings, conclusions, and recommendations of the CA are summarized below.

### Findings

- The groundwater flow direction at the site is north-northeast.
- Organic vapor analyzer (OVA) headspace analysis of site soils indicate that excessively petroleum-contaminated soil is present in 2 of the 19 soil borings drilled at the site. The extent of excessively petroleum-contaminated soils appears to be restricted to a relatively small area less than 30 feet north and northwest of the former UST location (Executive Summary Figure). This area is mostly covered by asphalt. Vertically, soil contamination occurs approximately 4 feet below land surface (bls) and is within 1 foot of the vadose-saturated zone interface. The estimated volume of excessively contaminated soil is 17 cubic yards.
- Laboratory results of groundwater samples collected February 5, 1992, indicated groundwater contamination exceeded State target levels or recommended guidance concentrations for fluorene, phenanthrene, total volatile organic aromatics (total VOA), total naphthalenes, and TRPH.
- Laboratory results of groundwater samples collected April 23, 1992, indicated an overall decrease in concentrations of petroleum constituents detected in groundwater samples collected February 5, 1992. Only methylene chloride and TRPH were detected in concentrations exceeding State recommended guidance concentrations or target levels. The presence

of methylene chloride in groundwater samples is likely the result of laboratory contamination. TRPH contamination levels for the April 23, 1992, analytical data are shown in the Executive Summary Figure. TRPH concentrations exceeded the State target level of 5 parts per million (ppm) in only the sample collected from well PEN-3810N-MW2.

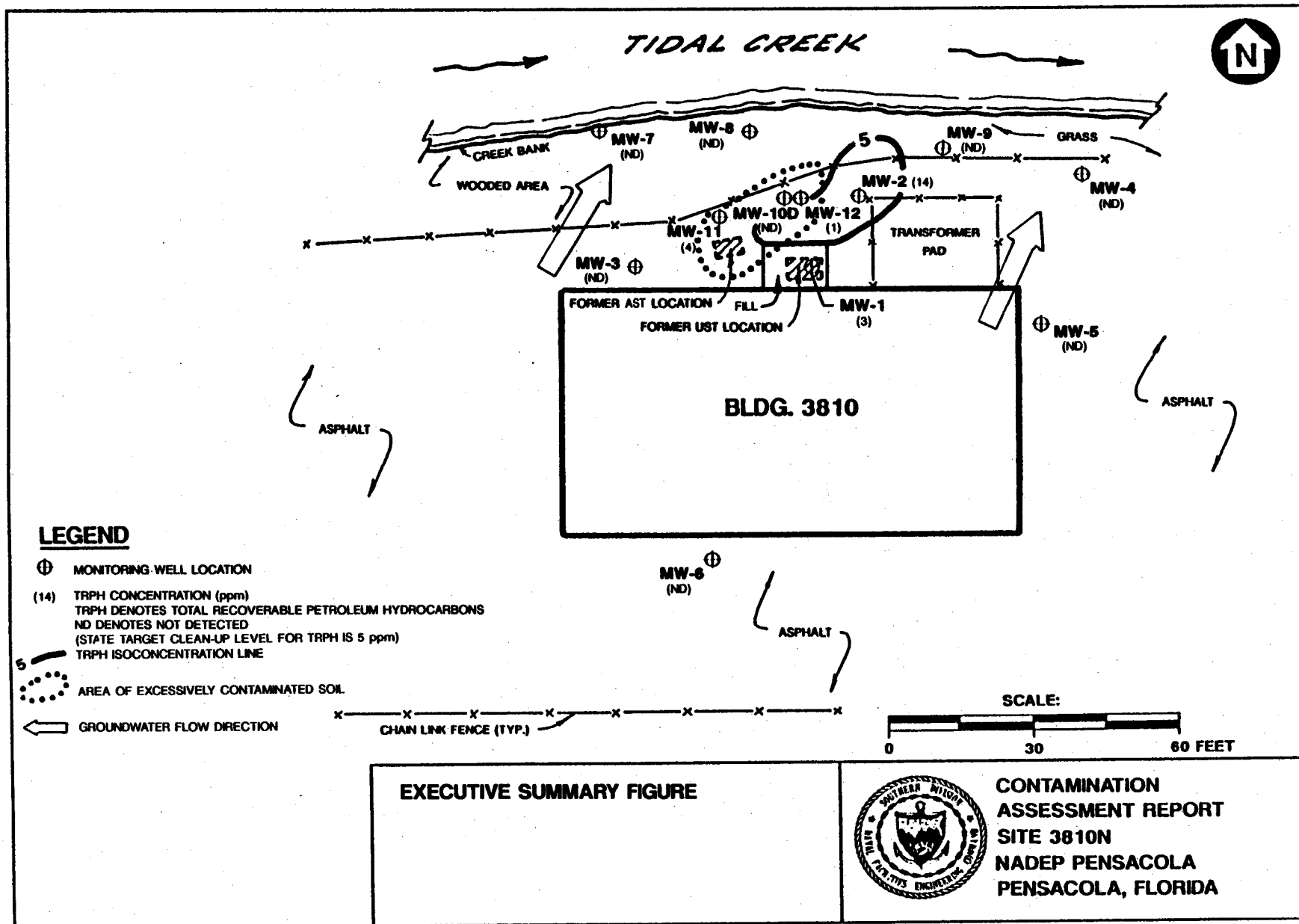
- The vertical extent of groundwater contamination appears to be less than 15 feet bls in the area downgradient of the former UST. Groundwater contamination in well PEN-3810N-MW10D, which is screened from 15 to 20 feet bls, was below State target levels.
- No potable water wells were identified within a 0.25-mile radius of the site.

### Conclusions

- The apparent source of petroleum contamination has been removed.
- The area of excessively petroleum-contaminated soils appears to be restricted to a small area north and northwest of the former UST location. This area is mostly covered by asphalt, thereby reducing the risk of exposure to potential receptors.
- Groundwater contaminant levels have decreased since the initial sampling event. The sample from only one well, PEN-3810N-MW2, exceeded the State target level for TRPH in the April 23, 1992, sampling event. The area of concern appears to be restricted to the area in the vicinity of well PEN-3810N-MW2. TRPH were not detected in the four wells downgradient to this well. Contamination does not appear to have migrated offsite, and it does not appear feasible that this contamination will affect potable water supplies at the base.

### Recommendations

Based on the findings and conclusions discussed above, a *Monitoring Only Plan (MOP)* is recommended for site 3810N. The scope of this plan is discussed in Section 6.3 of this report.



## ACKNOWLEDGMENTS

In preparing this report, The Underground Storage Tank Section of the Navy Comprehensive Long-Term Environmental Action, Navy (CLEAN) Group at ABB Environmental Services, Inc. (ABB-ES), commends the support, assistance, and cooperation provided by the personnel of the Naval Aviation Depot (NADEP), Pensacola, Florida, and Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM). In particular, ABB-ES acknowledges the effort provided by the following people during the investigation and preparation of this report.

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## GLOSSARY

The following list contains many of the acronyms, initialisms, abbreviations, and units of measure used in this report.

ABB-ES	ABB Environmental Services, Inc.
AST	aboveground storage tank
BETX	benzene, ethyl benzene, toluene, and xylenes
bls	below land surface
CA	Contamination Assessment
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action, Navy
CompQAP	Comprehensive Quality Assurance Plan
CTO	Contract Task Order
EDB	ethylene dibromide
FAC	Florida Administrative Code
FDER	Florida Department of Environmental Regulation
FID	flame ionization detector
ft/day	feet per day
ft <sup>2</sup> /day	feet squared per day
ft/ft	feet per foot
ft/min	feet per minute
GC	gas chromatograph
HSWA	Hazardous and Solid Waste Amendments of 1984
ID	inside diameter
K	hydraulic conductivity
msl	mean sea level
µg/l	micrograms per liter
µmhos/cm	micromhos per centimeter
NADEP	Naval Aviation Depot
NARF	Naval Air Rework Facility
NAS	Naval Air Station
ND	not detected
NGVD	National Geodetic Vertical Datum
OVA	organic vapor analyzer
PAH	polynuclear aromatic hydrocarbons
POA	Plan of Action
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
SOUTHNAVFACENGCOM	Southern Division, Naval Facilities Engineering Command
SPT	standard penetration test
SWDA	Solid Waste Disposal Act of 1965
TRPH	total recoverable petroleum hydrocarbons
UIC	uniform identification code
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey

## GLOSSARY--Continued

UST	underground storage tank
V	average pore water velocity
VOA	volatile organic aromatics
VOC	volatile organic compounds

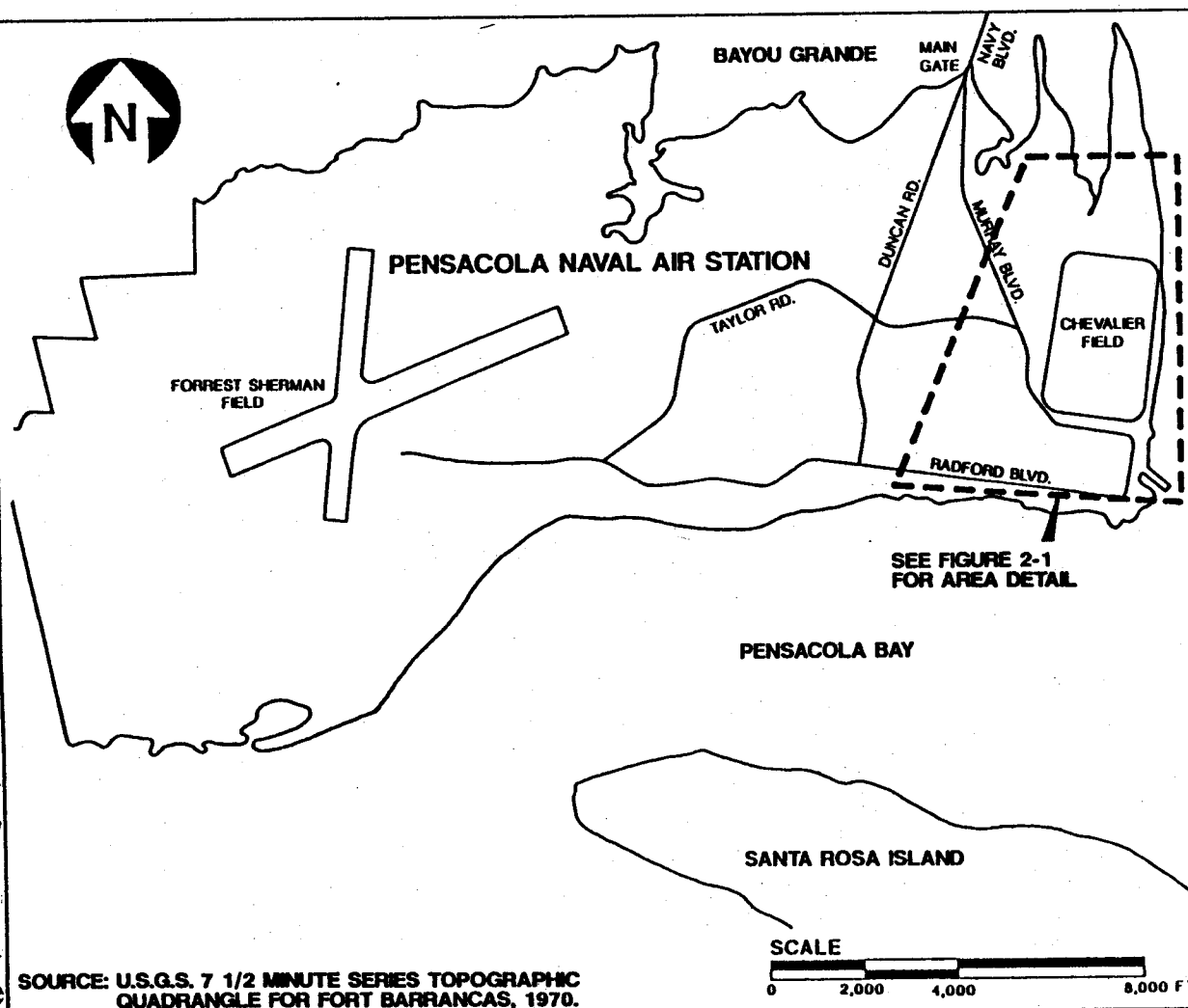
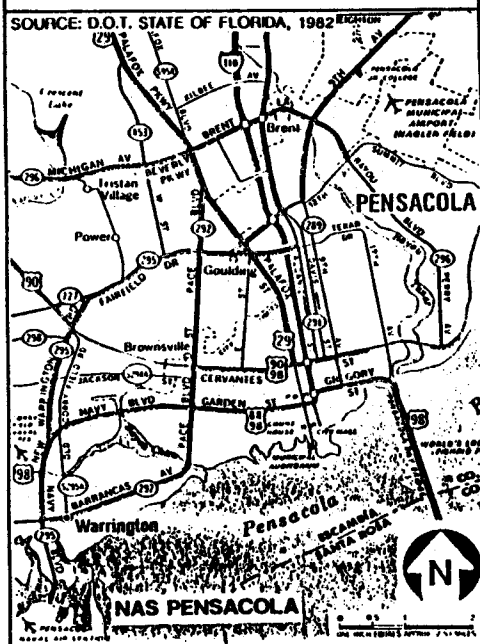
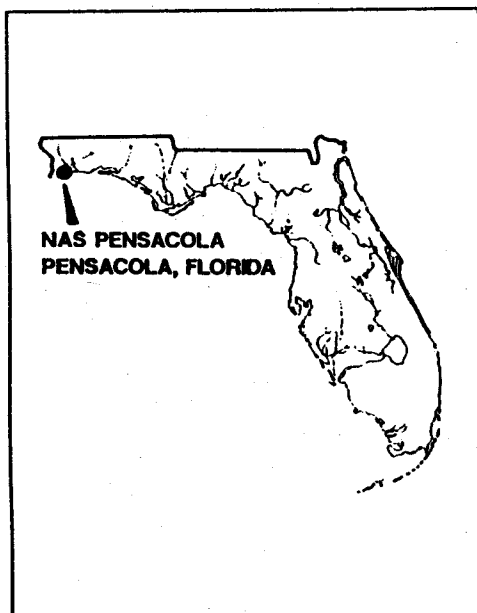
## 1.0 INTRODUCTION

In 1987, the Naval Air Rework Facility (NARF) in Pensacola, Florida, was renamed the Naval Aviation Depot (NADEP). NADEP Pensacola, Florida, formerly the operations and repair department of the Naval Air Station (NAS) Pensacola, is now a tenant command located on NAS facilities within the Pensacola Naval Base Complex. The Pensacola Naval Base Complex is located on the western edge of Pensacola Bay on State Route 295 (Navy Boulevard; Figure 1-1). NADEP Pensacola occupies approximately 130 acres at NAS Pensacola. The mission of NADEP Pensacola is to: maintain and operate facilities for, and perform a complete range of, depot-level rework operations on designated weapons systems, accessories, and equipment; manufacture parts and assemblies, as required; provide engineering services in hardware design; furnish technical services on aircraft maintenance and logistic problems; and perform other levels of aircraft maintenance.

During a tank removal program implemented by the U.S. Department of the Navy in 1989 and 1990, petroleum underground storage tanks (USTs) at various NADEP site locations were removed. In many cases, these tanks were replaced with new USTs. Tank contents were reportedly restricted to petroleum products ranging from waste oil, diesel fuel, unleaded gasoline, and PD-680 (a petroleum distillate solvent similar to mineral spirits). The reported volumes of the tanks varied from 500 to 3,000 gallons. Soil samples were collected from each tank excavation and analyzed for total recoverable petroleum hydrocarbons (TRPH). Based on TRPH concentrations, 18 sites were found to be non-compliant with Florida Department of Environmental Regulation (FDER) target levels, as defined in Chapter 17-770, Florida Administrative Code (FAC).

ABB Environmental Services, Inc. (ABB-ES), was contracted by Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform a contamination assessment (CA) and submit a Contamination Assessment Report (CAR) for the 18 petroleum contaminated sites at NADEP. This CAR is submitted for one of the sites, Site 3810N. The scope of services for the work at Site 3810N is described in contract task order (CTO) No. 008, the plan of action (POA), and the contamination assessment plan (CAP) and included the following:

- drilling soil borings and analyzing site soils to assess the extent of soil contamination,
- installing and sampling groundwater monitoring wells to assess the extent of groundwater contamination,
- collecting water level data to assess the groundwater flow direction and hydraulic gradient at the site,
- conducting a potable well inventory within a 0.25-mile radius of the site,
- conducting slug tests on selected wells to estimate aquifer characteristics, and



SOURCE: U.S.G.S. 7 1/2 MINUTE SERIES TOPOGRAPHIC  
QUADRANGLE FOR FORT BARRANCAS, 1970.

FIGURE 1-1  
FACILITY LOCATION MAP



CONTAMINATION  
ASSESSMENT REPORT  
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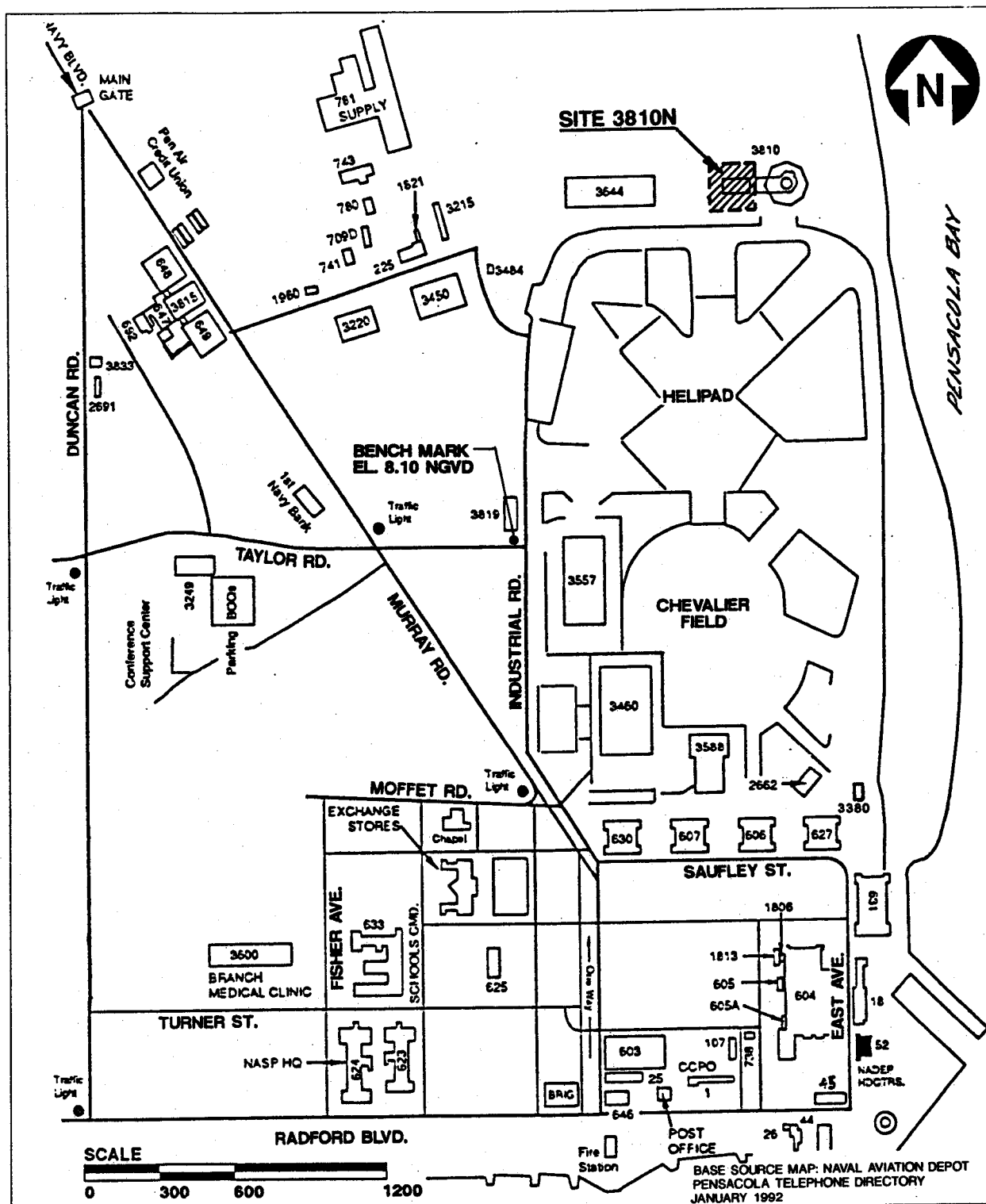
- reducing and analyzing pertinent data gathered during the CA to complete this CAR.

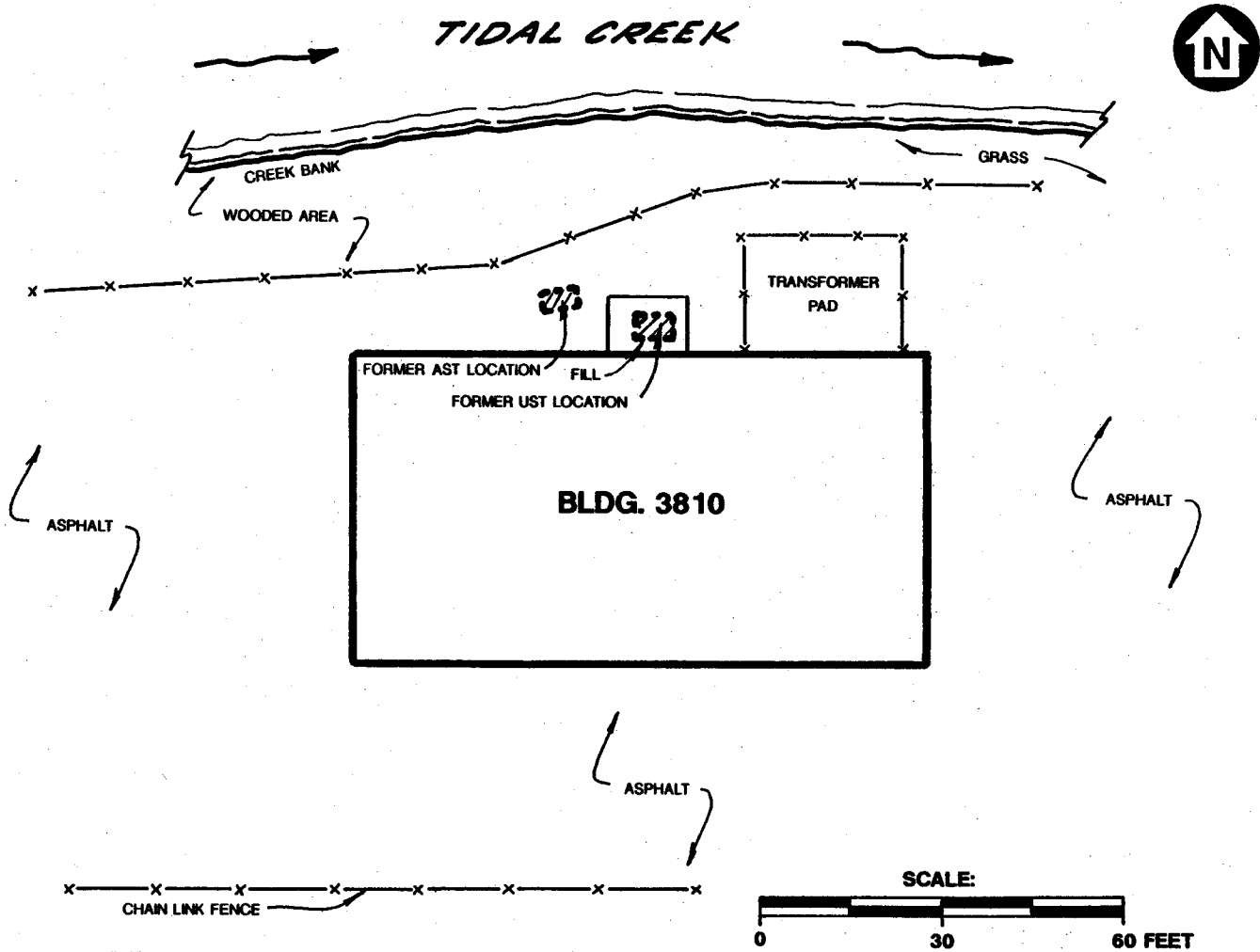
The CA at Site 3810N was conducted from January through August 1992. The following sections of this report present the background information, data compilation, results, conclusions, and recommendations of the CAR.

## 2.0 SITE BACKGROUND

2.1 SITE DESCRIPTION. Building 3810 is located on the north side of Chevalier Field (Figure 2-1). This facility is used for the testing of helicopter blades. Site 3810N is the former location of a 500-gallon UST used for fuel oil storage. Figure 2-2 is a site plan showing the location of the former UST and surface features in the site vicinity. The former UST was located on the north side of Building 3810. This area was unpaved at the time of this investigation. The area surrounding the former UST location is covered by asphalt. The asphalted area extends north from Building 3810 to a fence line located approximately 20 to 30 feet north of the building. A tidal creek approximately 60 feet north of Building 3810 diverts storm runoff east towards Pensacola Bay. The area between the fence and the tidal creek is wooded. A transformer pad is located approximately 15 feet east of the former UST. An aboveground storage tank (AST), reportedly used to store fuel oil, was located approximately 15 feet northwest of the former UST location. This tank was removed from the site during this investigation.

2.2 SITE HISTORY. The former fuel oil UST was installed in 1982. During the tank removal and replacement program, the UST was replaced with the AST. A composite soil sample was collected from the UST excavation and analyzed for TRPH. The reported TRPH concentration of 1,600 parts per million (ppm) exceeded the State target level of 50 ppm for petroleum contaminated soils (FDER, May 1992) and, therefore, warranted further investigation pursuant to Chapter 17-770, FAC.





**FIGURE 2-2  
SITE PLAN**



**CONTAMINATION  
ASSESSMENT REPORT  
SITE 3810N  
NADEP PENSACOLA  
PENSACOLA, FLORIDA**



### 3.0 SITE CONDITIONS

3.1 PHYSIOGRAPHY. Regional physiography is discussed in Appendix A, Site Conditions. Surface elevations at the site are relatively flat and vary from 5 to 9 feet above mean sea level (msl).

#### 3.2 HYDROGEOLOGY.

3.2.1 Regional and Local The Pensacola area is underlain by three water bearing zones. These zones, in order of increasing depth, are the sand-and-gravel aquifer, the Upper Floridan aquifer, and the Lower Floridan aquifer. A detailed discussion of these three aquifers is presented in Appendix A.

3.2.2 Site specific The principal aquifer of concern at the site is the surficial zone of the sand-and-gravel aquifer. The surficial zone was penetrated to a depth of 27 feet during this investigation. This zone is generally composed of very fine-grained to medium-grained quartz sand. The sand varies in color from orange-brown to reddish-brown, to tan, gray, and white. The surficial zone is unconfined, and the water table was encountered at depths of 2 to 7 feet below land surface (bls) during this investigation. Site-specific aquifer characteristics and other hydrogeologic parameters are discussed in Section 5.1.

Lithologic logs for soil borings SB1 through SB14 are presented in Appendix B, Lithologic Logs. Soil borings SB15 through SB19 were drilled to 4 feet bls, and because of the shallow boring depth, lithologic logs were not recorded.

## 4.0 METHODOLOGIES AND EQUIPMENT

4.1 SOIL BORING AND SOIL SAMPLING PROGRAM. Nineteen soil borings, SB1 through SB19, were drilled at the site to assess the extent and levels of soil petroleum contamination, characterize the type of subsurface material, and aid in the placement of subsequent groundwater monitoring wells. Soil boring locations are shown in Figure 4-1. Soil samples collected from split-spoon standard penetration tests (SPTs) were analyzed for petroleum constituents with an organic vapor analyzer (OVA) equipped with a flame ionization detector (FID). The results of the soil boring program and soil sampling program are discussed in Section 5.2.

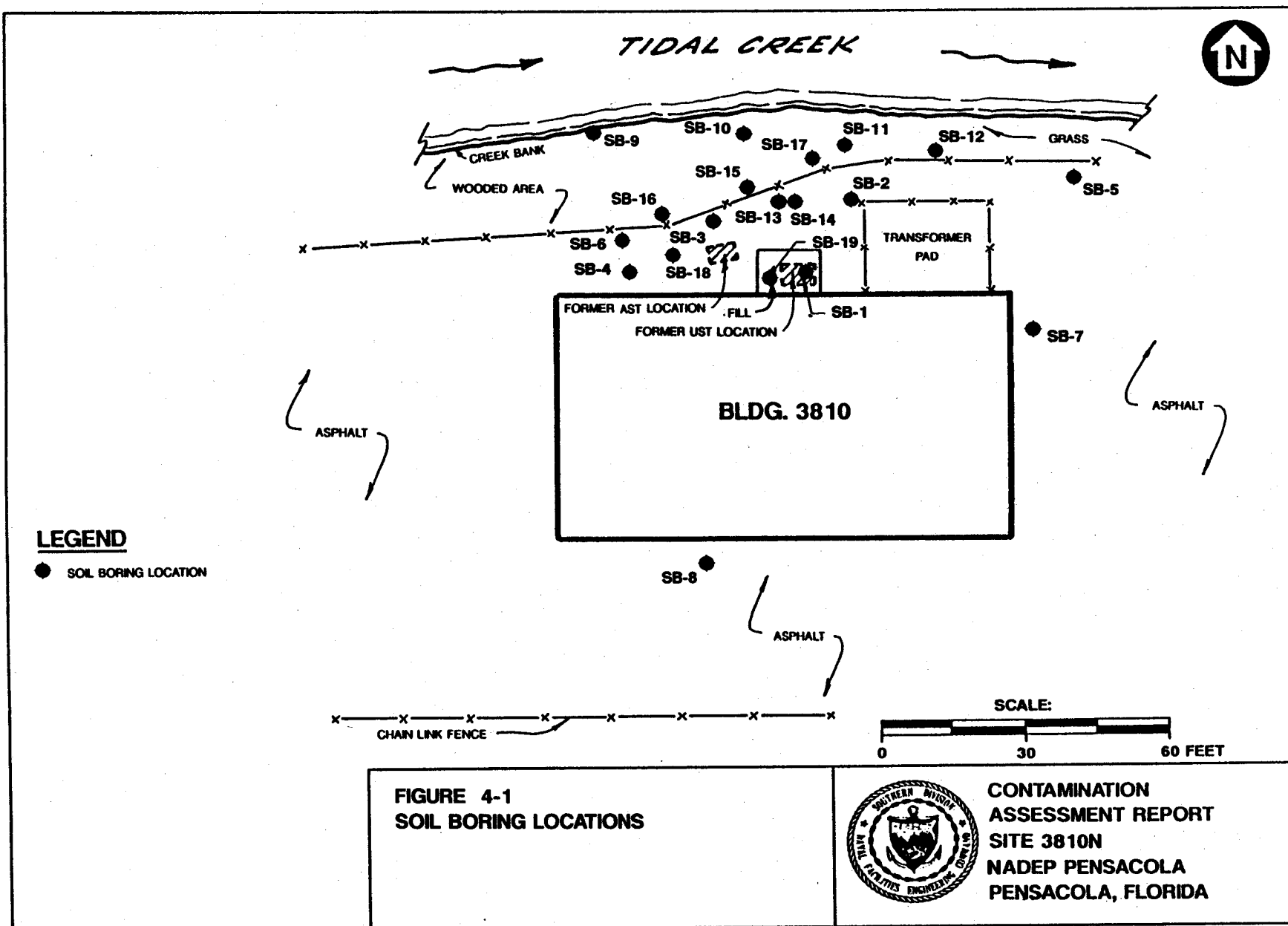
4.2 MONITORING WELL INSTALLATION PROGRAM. Twelve, 2-inch inside diameter (ID) monitoring wells (PEN-3810N-MW1 through PEN-3810N-MW9, PEN-3810N-10D, PEN-3810N-MW-11, and PEN-3810N-MW12; designated as MW1 through MW9, MW10D, MW11, and MW12 on figures and tables in this report) were installed in 12 of the soil borings. Monitoring well locations are shown in Figure 4-2. One deep well, PEN-3810N-MW10D, was installed at a depth of 20 feet bls with a screened interval of 15 to 20 feet bls. All other wells were screened from 3 to 13 feet bls. Monitoring well construction methodologies and materials are discussed in Appendix C, Investigative Methodologies and Procedures.

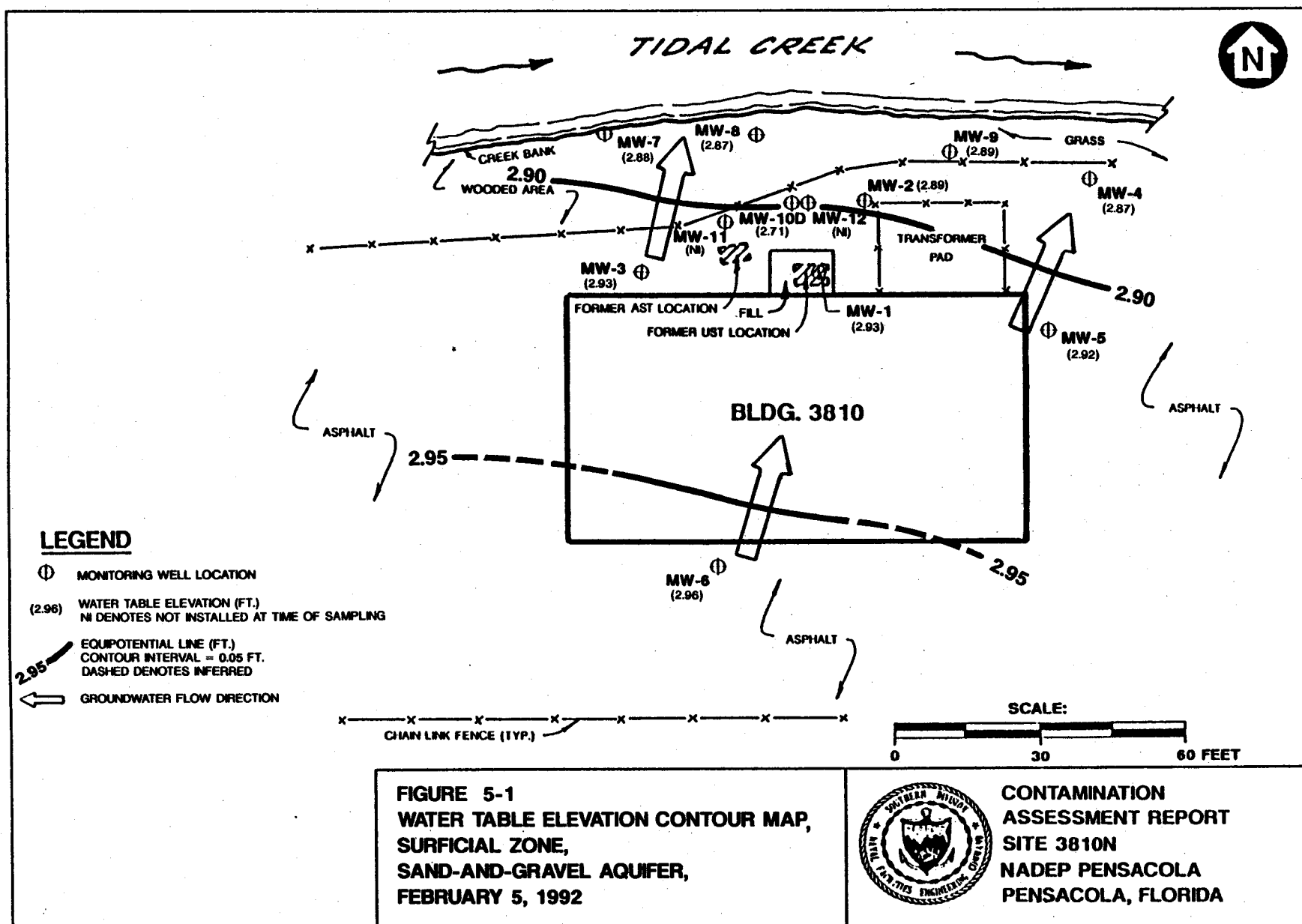
4.3 GROUNDWATER ELEVATION SURVEY. The elevation of the water table was measured by surveying the top of the well casing for each monitoring well to a common reference datum using a surveyor's level and stadia rod. Elevations were referenced to a benchmark located on the Taylor Road culvert, 1,800 feet southwest of the site, near the intersection of Taylor and Industrial Roads (see Figure 2-1). This benchmark is part of the U.S. Coastal and Geodetic Survey benchmarking system and has an elevation of 8.10 feet above the National Geodetic Vertical Datum (NGVD) of 1929.

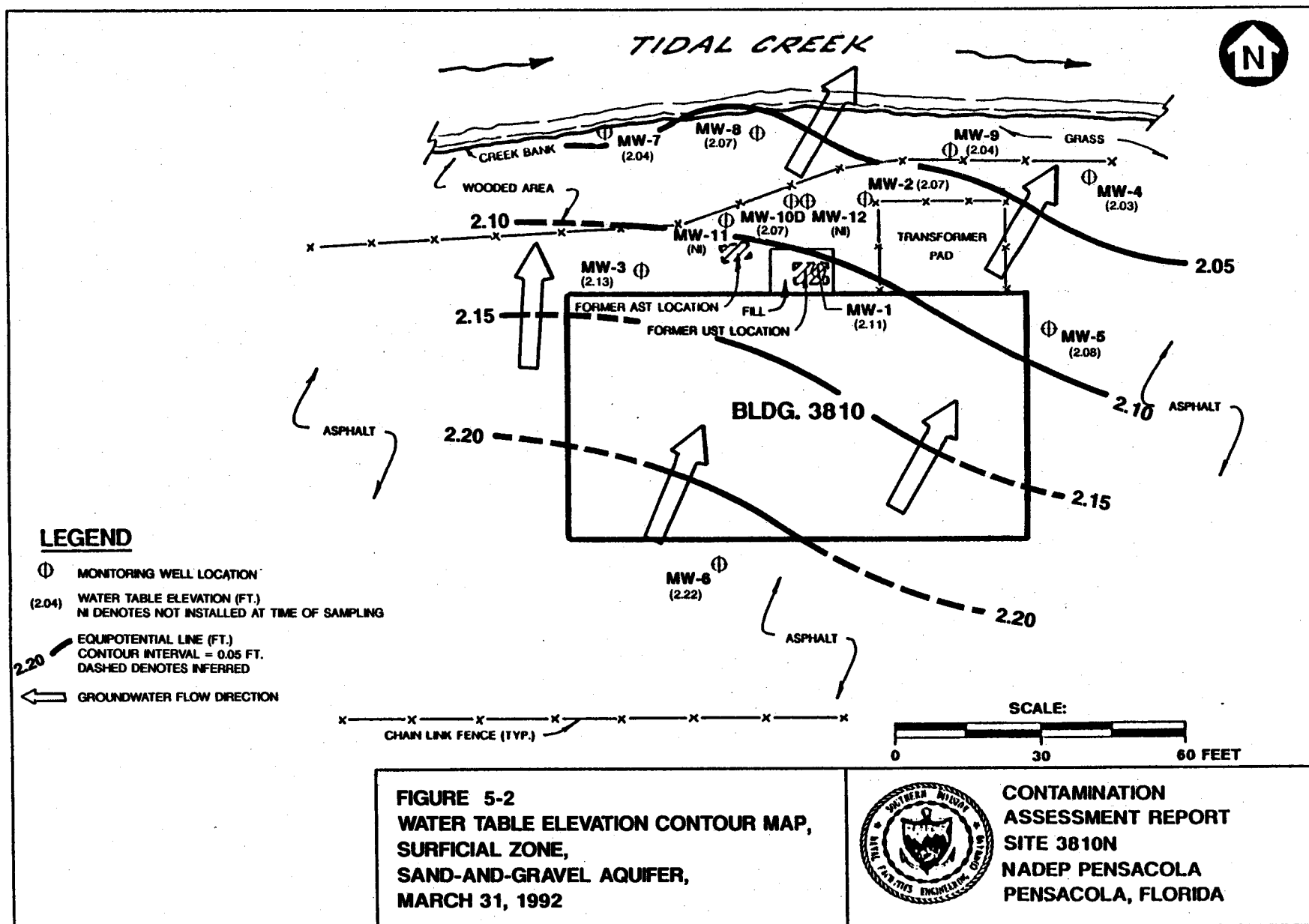
Groundwater levels were recorded on February 5, March 31, and April 23, 1992. Procedures for obtaining groundwater level measurements are described in Appendix C.

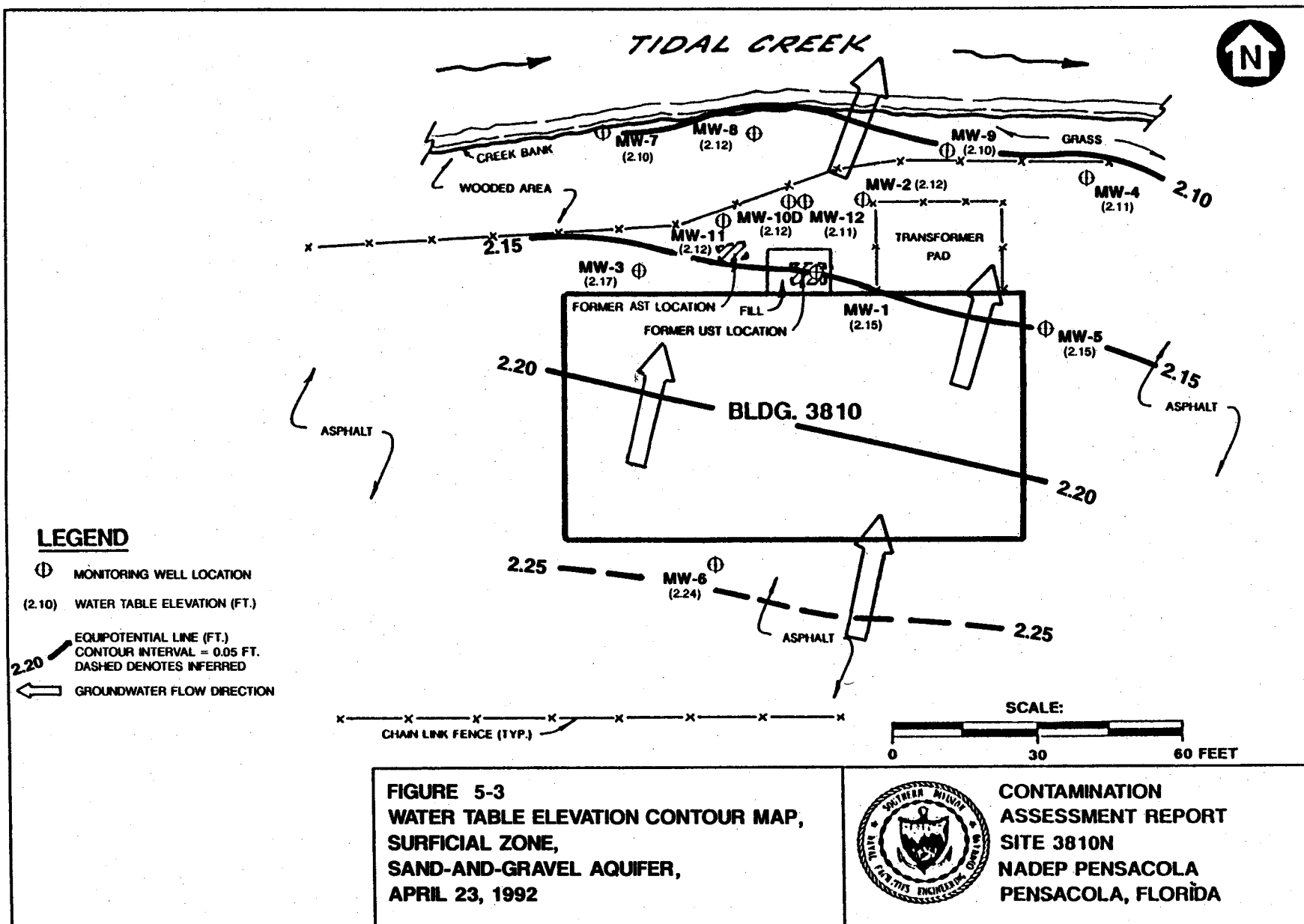
4.4 GROUNDWATER SAMPLING PROGRAM. Groundwater samples were collected from monitoring wells PEN-3810N-MW1 through PEN-3810N-MW10D on February 5, 1992. Monitoring well PEN-3810N-MW11 and PEN-3810N-MW12 had not been installed at that time. All monitoring wells, including PEN-3810N-MW11 and PEN-3810N-MW12, were sampled on April 23, 1992. Samples from both sampling events were sent to Wadsworth/ALERT Laboratories, Tampa, Florida, for analysis. A duplicate sample, laboratory blanks, equipment blank, and a trip blank were also analyzed with the monitoring well samples. Procedures for collection of groundwater samples are presented in Appendix C.

4.5 AQUIFER SLUG TESTS. Three rising head slug tests were performed on monitoring wells PEN-3810N-MW4, PEN-3810N-MW6, and PEN-3810N-10D to estimate the hydraulic conductivity of the aquifer. Procedures for conducting slug tests are included in Appendix C. Slug test graphical data and calculations are attached in Appendix D, Aquifer Parameter Calculations.









The calculated average hydraulic gradient at the site is  $1.5 \times 10^{-3}$  feet per foot (ft/ft). Slug test results indicate an average horizontal hydraulic conductivity (K) of  $5.0 \times 10^{-1}$  feet per day (ft/day). The calculated pore water velocity (V) is  $3.0 \times 10^{-1}$  ft/day. Equations and calculations used to estimate these values are presented in Appendix D.

## 5.2 CONTAMINANT PLUME DEFINITION AND CHARACTERIZATION.

**5.2.1 Soil Contamination** Soil samples were collected from all SPT samples taken from January 11 through August 3, 1992, at depths ranging from 4 to 6 feet bls, and analyzed using OVA headspace techniques. OVA headspace readings are presented in Table 5-2. According to FDER (May 1992), soil containing constituents of the kerosene analytical group with OVA headspace readings exceeding 50 ppm are considered as "excessively contaminated" and must be remediated, except under extenuating circumstances. Soil with OVA headspace readings between 10 ppm and 50 ppm are considered to be petroleum contaminated and may or may not require remediation, depending on the impact of soil contamination on groundwater. Soil with OVA headspace readings of less than 10 ppm is not considered to be petroleum-contaminated.

**Table 5-2**  
**Summary of Soil Sample Organic Vapor Analyzer (OVA) Headspace Analyses,**  
**January 11 through August 3, 1992**

Contamination Assessment Report  
Site 3810N, Naval Aviation Depot  
Pensacola, Florida

Boring Designation	Depth (feet)	Concentration <sup>1</sup> (ppm)	Comments
SB1/MW1	5 to 7	16	Strong diesel odor
SB2/MW2	5 to 6	2	Slight diesel odor, some discoloration
SB3/MW11	4 to 6	103	Strong diesel odor
SB4/MW3	5 to 7	0	No odor and no discoloration
SB5/MW4	5 to 7	10	No odor and no discoloration
SB6	4 to 6	0	No odor and no discoloration
SB7/MW5	4 to 6	0	No odor and no discoloration
SB8/MW6	4 to 6	0	No odor and no discoloration
SB9/MW7	4	0	No odor and no discoloration
SB10/MW8	4	0	No odor and no discoloration
SB11/MW9	4	4	No odor and no discoloration
SB12	4	5	No odor and no discoloration
SB13/MW10D	4 to 6	175	Slight diesel odor
SB14/MW12	4 to 5	70	Strong diesel odor
SB15	4	0	No odor and no discoloration
SB16	4	1	No odor and no discoloration
SB17	4	38	No odor and no discoloration
SB18	4	1	No odor and no discoloration
SB19	4	0	No odor and no discoloration

<sup>1</sup>Corrected for methane.

Note: ppm = parts per million.

No volatile organic compounds (VOC) were detected in soil samples collected from land surface to 4 feet bls. The water table at the site was generally encountered at 4 to 6 feet bls during this investigation. Where present, soil contamination was found to occur less than 1 foot above the water table. It is possible petroleum contamination may have been originally discharged as free product, and the observed soil contamination may be residuum of this contamination. During periods of high water tables, this zone may be below the water table.

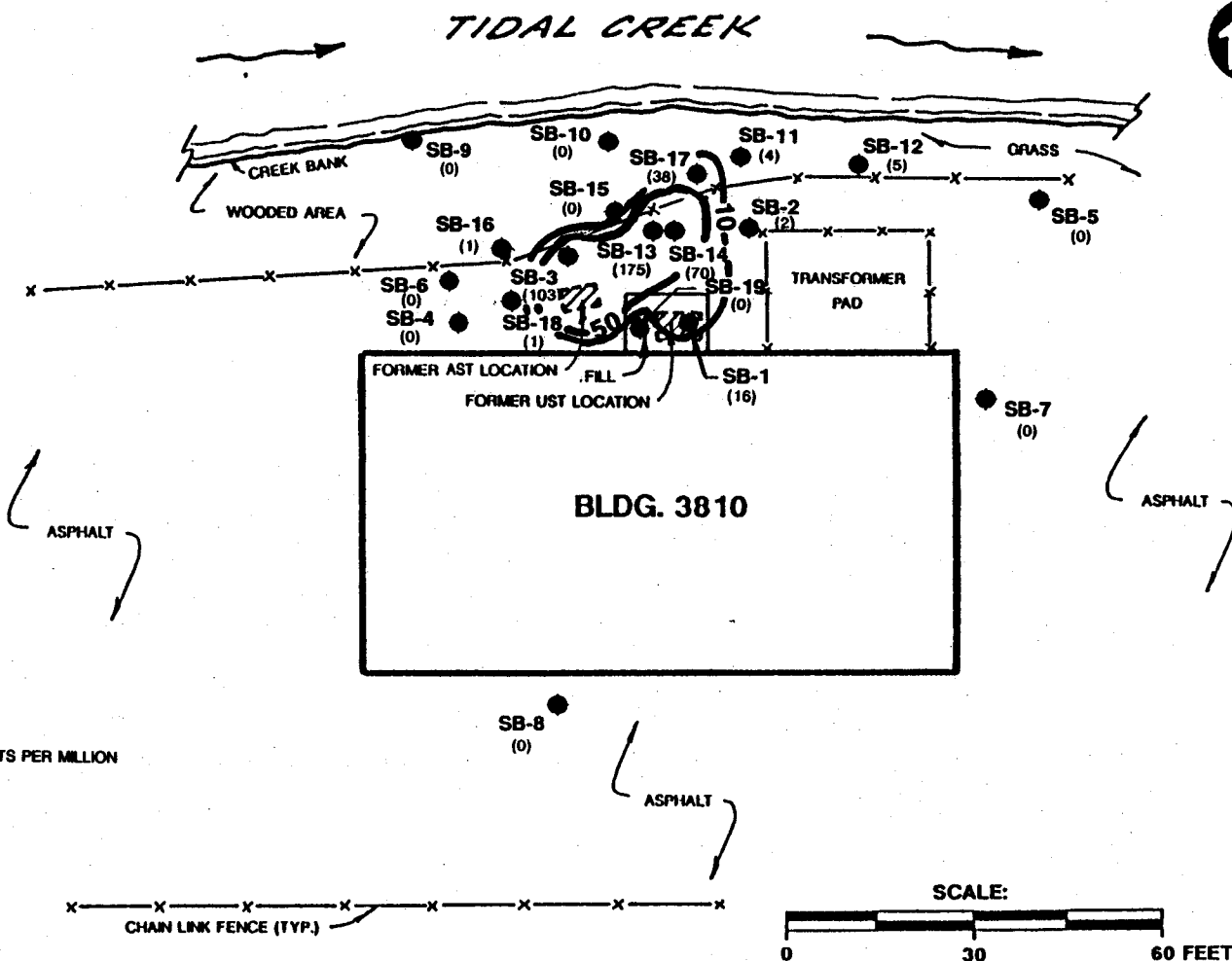
Minimal concentrations of VOC were detected in headspace readings of samples collected from soil borings SB1, SB2, SB5, SB11, SB12, SB16, SB18, and SB19. Excessively contaminated soil was identified in soil borings SB3 (103 ppm) and SB14 (70 ppm). Figure 5-4 shows the estimated extent of soil contamination at the site based on OVA headspace readings. The approximate area of petroleum soil contamination is indicated by the 10 ppm isoconcentration line (isocon). The extent of excessively contaminated soils is approximated by the 50 ppm isocon. Excessively contaminated soil appears to be restricted to a small area less than 30 feet north and northwest of the former UST location. Almost all of this area is covered by asphalt. Soil contamination also appears to be restricted to within a 1-foot thick vertical zone at approximately 4 to 5 feet bls. Assuming a 1-foot vertical column of soil contamination, the estimated volume of excessively contaminated soil is approximately 17 cubic yards.

Because: (1) petroleum-contaminated soil is limited to a small area within the site, (2) most of the contaminated area is covered by asphalt, (3) downgradient soil was not petroleum contaminated (OVA headspace readings were less than 10 ppm), and (4) soil contamination appears to be restricted from 4 to 5 feet bls, it does not appear that soil contamination poses an environmental or health risk at the site.

**5.2.2 Groundwater Assessment** In some areas near NAS Pensacola, the surficial zone of the sand-and-gravel aquifer has been demonstrated to be hydraulically connected with the main producing zone of the sand-and-gravel aquifer, making potable water supplies susceptible to contamination in these areas (Roaza and others, 1991). For this reason, the surficial zone at NAS Pensacola will be herein treated as a Class G-II water source, and Class G-II State groundwater target levels will be applied throughout this report.

Groundwater samples were collected from site monitoring wells PEN-3810N-MW1 through PEN-3810N-MW10D on February 5, 1992. These monitoring wells and two additional wells, PEN-3810N-MW11 and PEN-3810N-MW12, were sampled on April 23, 1992, to verify the concentrations of compounds reported in the February 5, 1992, analytical results, and to assess whether or not contaminants had migrated downgradient into the tidal creek located north of the site. Samples were submitted to Wadsworth/Alert Laboratories in Tampa, Florida, for analyses of VOC, polynuclear aromatic hydrocarbons (PAHs), ethylene dibromide (EDB), TRPH, and lead. Groundwater analytical laboratory results for the February 5, 1992, and April 23, 1992, sampling events are summarized in Tables 5-3 and 5-4, respectively.





**LEGEND**

- SOIL BORING LOCATION
- (4) OVA HEADSPACE READING IN PARTS PER MILLION
- 50' ISOCONCENTRATION LINE

SCALE:



**FIGURE 5-4**  
**SOIL CONTAMINATION DISTRIBUTION MAP,**  
**JANUARY 11 THROUGH AUGUST 3, 1992**



**CONTAMINATION**  
**ASSESSMENT REPORT**  
**SITE 3810N**  
**NADEP PENSACOLA**  
**PENSACOLA, FLORIDA**

**Table 5-3**  
**Summary of Groundwater Sample Laboratory Analyses,**  
**February 5, 1992**

Contamination Assessment Report  
Site 3810N, Naval Aviation Depot  
Pensacola, Florida

Compound	State Target Level or Guidance Concentration	MW1	MW2	MW3	MW4	MW5	MW5 Duplicate	MW6	MW7	MW8	MW9	MW10D
Ethyl benzene		ND	16	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes		30	39	ND	ND	ND	ND	ND	ND	ND	ND	5
Toluene <sup>1</sup>		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total VOA <sup>2</sup>	<sup>3</sup> 50	30	55	ND	ND	ND	ND	ND	ND	ND	ND	5
Methylene chloride	<sup>4</sup> 5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2
1-Methylnaphthalene		ND	88	ND	ND	ND	ND	ND	ND	ND	ND	30
2-Methylnaphthalene		ND	76	ND	ND	ND	ND	ND	ND	ND	ND	31
Naphthalene		ND	45	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total naphthalenes <sup>5</sup>	<sup>3</sup> 100	ND	209	ND	ND	ND	ND	ND	ND	ND	ND	61
Fluorene	<sup>4</sup> 10	ND	13	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	<sup>4</sup> 10	ND	14	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRPH	<sup>3</sup> 5	5	54	ND	ND	1	ND	ND	ND	2	2	1

<sup>1</sup>Detected in trip blank at a concentration of 30 parts per billion (ppb).

<sup>2</sup>Total VOA is the sum of benzene, ethyl benzene, toluene, and xylenes.

<sup>3</sup>State target level (Florida Department of Environmental Regulation [FDER], Chapter 17-1770, Florida Administrative Code [FAC]).

<sup>4</sup>Guidance concentration recommended by FDER (February, 1989).

<sup>5</sup>Total naphthalenes is the sum of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene.

Notes: Concentrations are in parts per billion, except total recoverable petroleum hydrocarbons, which are in parts per million.

Duplicate sample was collected from monitoring well MW-5.

ND = not detected.

VOA = volatile organic aromatics.

TRPH = total recoverable petroleum hydrocarbons.

**Table 5-4**  
**Summary of Groundwater Sample Laboratory Analyses**  
**April 23, 1992**

Contamination Assessment Report  
Site 3810N, Naval Aviation Depot  
Pensacola, Florida

Compound	State Target Level or Guidance Concentration	MW1	MW2	MW3	MW3 Duplicate	MW4	MW5	MW6	MW6 Dupli- cate	MW7	MW8	MW9	MW10D	MW11	MW12
Benzene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1
Ethyl benzene		4	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2	4
Xylenes		25	2	1	ND	4	ND	ND	ND	ND	ND	ND	ND	9	12
Toluene		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total VOA <sup>1</sup>	<sup>3</sup> 50	29	3	1	ND	4	ND	ND	ND	ND	ND	ND	ND	11	17
Methylene chloride <sup>2</sup>	<sup>4</sup> 5	ND	12	ND	11	ND	ND	ND	11	ND	10	13	4	11	10
1,1,1-Trichloroethane	<sup>3</sup> 200	ND	ND	ND	ND	ND	ND	ND	ND	ND	7	ND	ND	13	ND
1-Methylnaphthalene		ND	24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	22
2-Methylnaphthalene		ND	18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13	23
Naphthalene		ND	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	13
Total naphthalenes <sup>5</sup>	<sup>3</sup> 100	ND	49	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	31	58
Fluorene	<sup>4</sup> 10	ND	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	<sup>4</sup> 10	ND	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5	ND
TRPH	<sup>3</sup> 5	3	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4	1

<sup>1</sup>Total VOA is the sum of benzene, ethyl benzene, toluene, and xylenes.

<sup>2</sup>Methylene chloride was detected in equipment blank, trip blank, and lab blank. See text for discussion.

<sup>3</sup>State target level (Florida Department of Environmental Regulation [FDER], Chapter 17-1770, Florida Administrative Code [FAC]).

<sup>4</sup>Guidance concentrations recommended by FDER (February, 1989).

<sup>5</sup>Total naphthalenes is the sum of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene.

Notes: Concentrations are in parts per billion, except total recoverable petroleum hydrocarbons, which are in parts per million.

Duplicate sample was collected from monitoring wells MW-3 and MW-6.

ND = not detected.

VOA = volatile organic aromatics.

TRPH = total recoverable petroleum hydrocarbons.

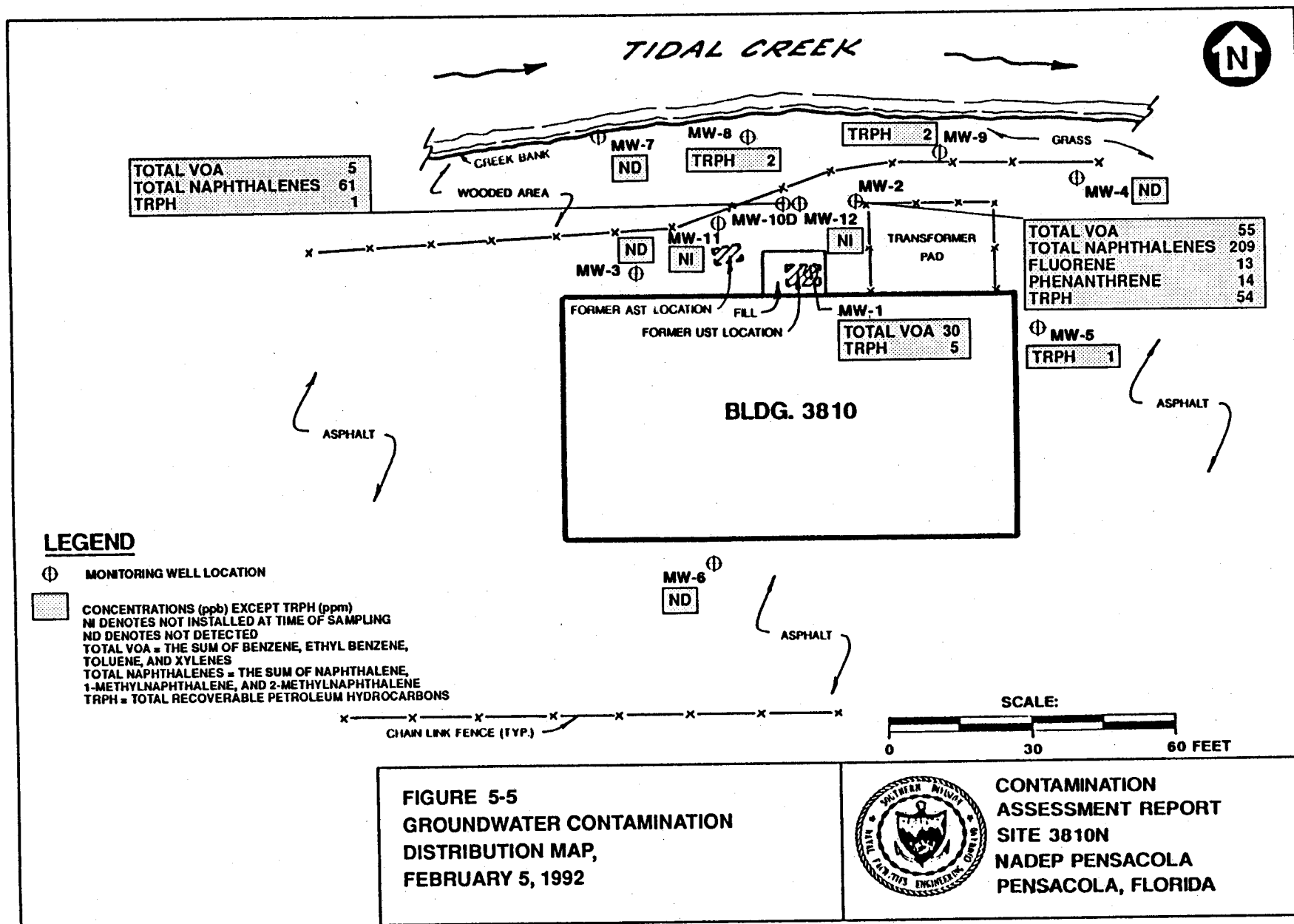
Figure 5-5 shows the distribution of contaminants detected in groundwater samples collected February 5, 1992. Contaminants identified in groundwater samples were ethyl benzene, xylenes, toluene, naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, fluorene, phenanthrene, TRPH, and methylene chloride. No contamination was detected in samples collected from wells PEN-3810N-MW3, PEN-3810N-MW4, PEN-3810N-MW6, and PEN-3810N-MW7. Methylene chloride was detected in only the sample collected from well PEN-3810N-MW10D, at a concentration of 2 parts per billion (ppm), which is below the recommended guidance concentration of 5 ppb (FDER, February 1989). The presence of methylene chloride in groundwater samples is commonly a result of laboratory contamination, and it does not appear to be a contaminant of concern at this site.

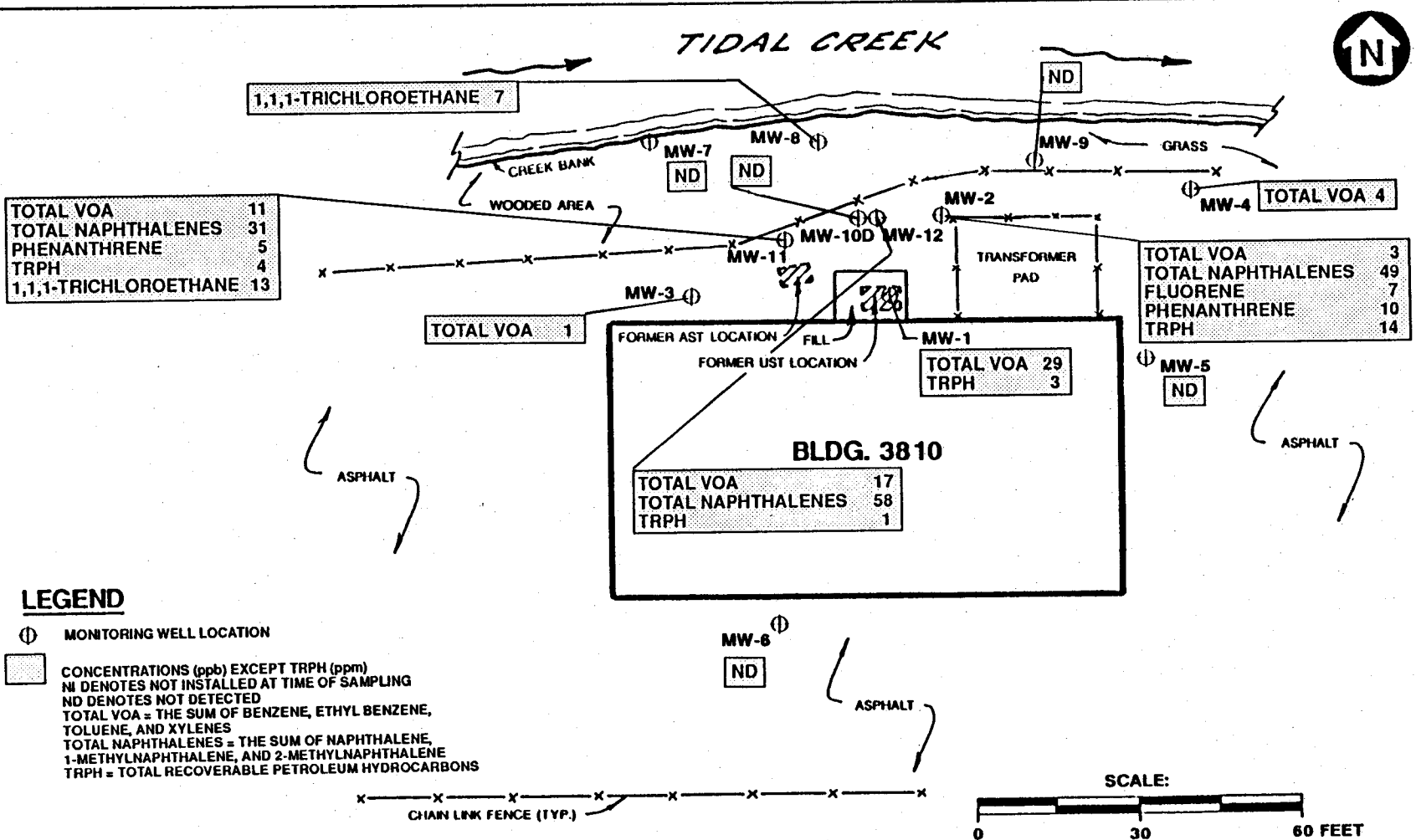
Groundwater contamination on February 5, 1992, exceeded State target levels in only the samples collected from well PEN-3810N-MW2. The samples collected from well PEN-3810N-MW2 exceeded the State target level of 10 ppb for PAH (fluorene and phenanthrene), total VOA (50 ppb), total naphthalenes (100 ppb), and TRPH (5 ppb) (total VOA is the sum of benzene, ethyl benzene, toluene, and xylenes; total naphthalenes is the sum of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene). These contaminants were either not detected, or did not exceed target levels, in samples collected from other wells at the site. Several of these wells are downgradient of well PEN-3810N-MW2. The February 5, 1992, data indicate that the area of groundwater contamination exceeding State target levels appears to be restricted to the vicinity of well PEN-3810N-MW2. The vertical extent of contamination does not appear to be greater than 20 feet bls. Contaminant levels in the sample collected from deep well PEN-3810N-MW10D, which was screened from 15 to 20 feet bls, did not exceed State target levels.

Figure 5-6 shows the distribution and concentrations of contaminants detected in groundwater samples collected April 23, 1992. Compounds detected in groundwater samples collected April 23, 1992, were fluorene, phenanthrene, benzene, total VOA, total naphthalenes, TRPH, 1,1,1-trichloroethane, and methylene chloride. The April 23, 1992, laboratory results indicate an overall decrease in the concentrations of contaminants detected in the February 5, 1992, sampling event. Methylene chloride and TRPH were the only contaminants exceeding State recommended guidance concentrations or target levels. Benzene, at a concentration of 1 ppb, was detected in only the sample collected from well PEN-3810N-MW12. The target level for benzene is 1 ppb. The isolated occurrence and low concentration of benzene in groundwater indicates benzene is not a contaminant of major concern at the site. Total VOA, total naphthalenes, fluorene, and phenanthrene levels had decreased to concentrations at or below State recommended guidance concentrations and target levels.

Total VOA, total naphthalenes, and TRPH contamination maps are shown in Figures 5-7, 5-8, and 5-9, respectively. Analytical results of samples collected February 5, 1992, and April 23, 1992, are shown on each figure. Concentrations of the February 5, 1992, samples are indicated in parentheses, whereas concentrations for the April 23, 1992, samples are indicated in brackets. The isocons on each figure correspond to the February 5, 1992, laboratory data.

The approximate areal extent of total VOA contamination for the February 5, 1992, data is indicated by the 50 ppb isocon in Figure 5-7. The area within the 50 ppb isocon approximates where total VOA concentrations exceeded State target levels

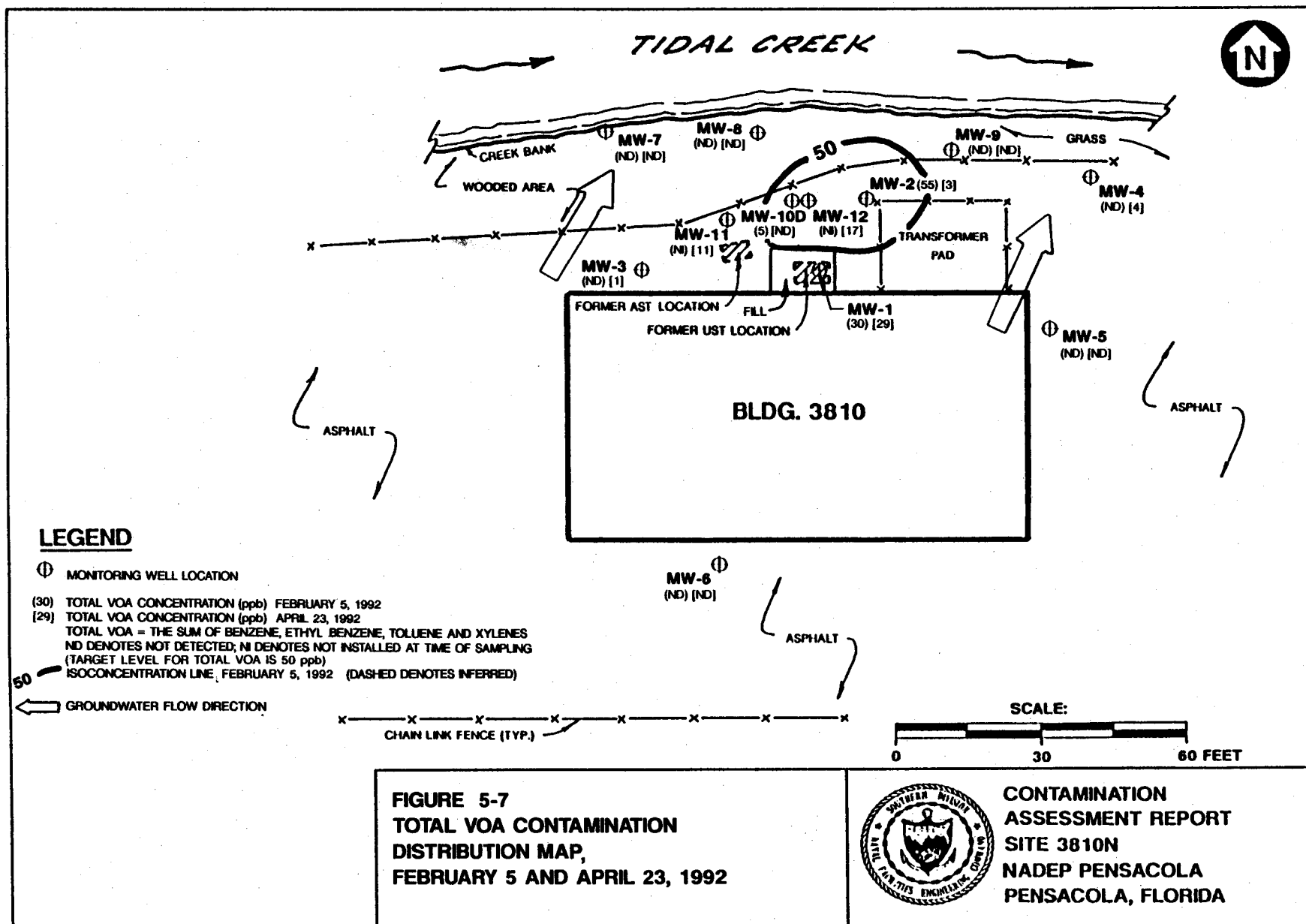


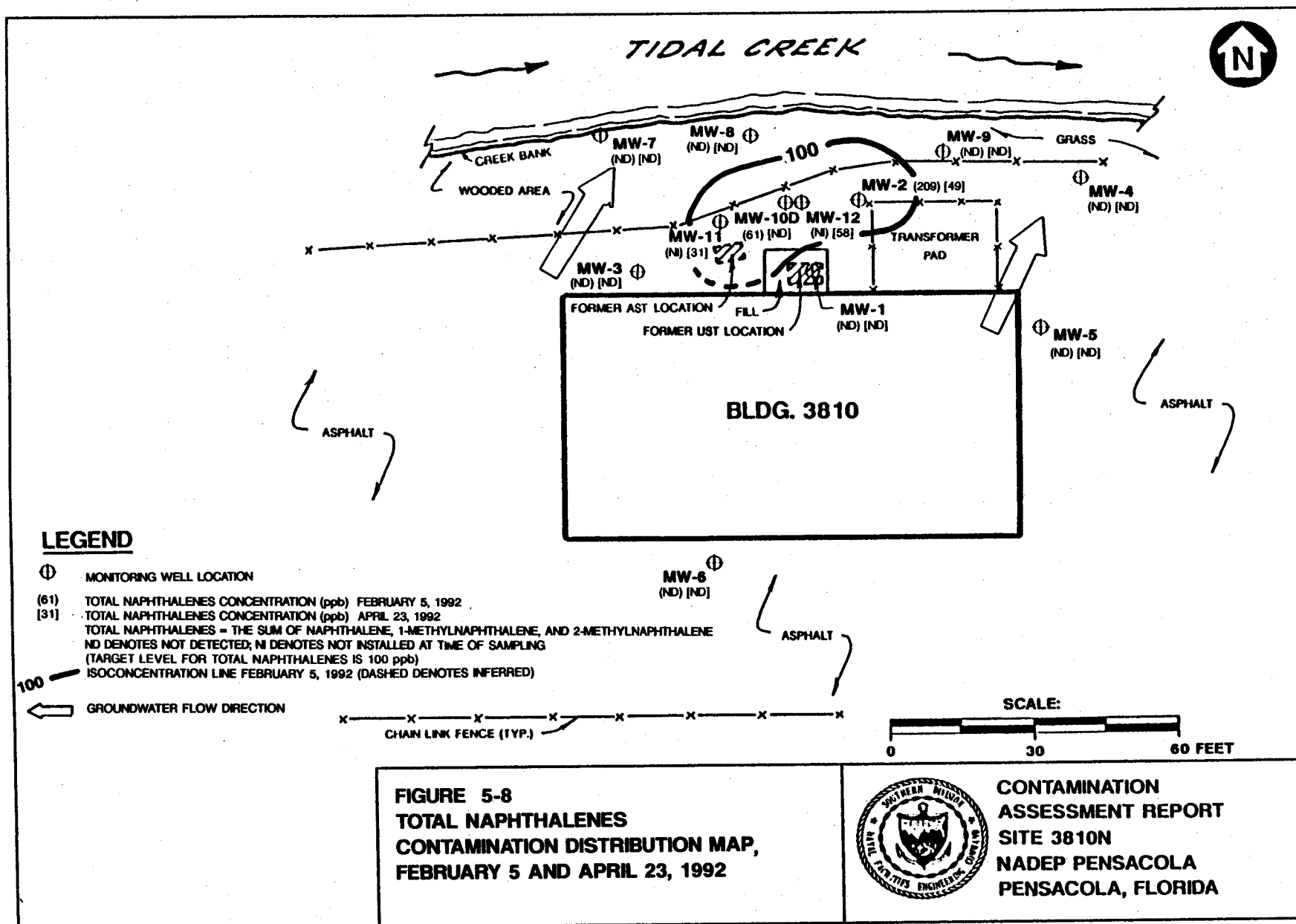


**FIGURE 5-6**  
**GROUNDWATER CONTAMINATION**  
**DISTRIBUTION MAP,**  
**APRIL 23, 1992**



**CONTAMINATION**  
**ASSESSMENT REPORT**  
**SITE 3810N**  
**NADEP PENSACOLA**  
**PENSACOLA, FLORIDA**









in groundwater samples collected February 5, 1992. The level of total VOA contamination decreased to below the target level of 50 ppb, as indicated by the April 23, 1992, data. The total VOA concentration in the most contaminated well, PEN-3810N-MW2, decreased from 55 ppb to 3 ppb. Total VOA concentrations for the April 23, 1992, samples were at or below State target levels in all site wells. VOAs were not detected in groundwater samples from wells PEN-3810N-MW8 and PEN-3810N-MW9, downgradient of the highest contaminated area, indicating that VOA contamination has not migrated to the tidal creek.

The approximate extent where total naphthalenes contamination exceeded State target levels for the February 5, 1992, sample collection data is indicated by the 100 ppb isocon in Figure 5-8. April 23, 1992, groundwater analytical data indicate the level of total naphthalenes contamination has decreased to below target levels since February 5, 1992. Total naphthalenes concentration in well PEN-3810N-MW2 decreased from 209 ppb to 49 ppb. Analytical results of groundwater samples collected April 23, 1992, indicate total naphthalenes concentrations were detected in only two other wells, PEN-3810N-MW11 and PEN-3810N-MW12, which are located in the vicinity of the former UST location. Total naphthalenes concentrations in groundwater samples from these two wells were below State target levels. Naphthalenes were not detected in downgradient wells PEN-3810N-MW4, PEN-3810N-MW7, PEN-3810N-MW8, and PEN-3810-MW9, indicating that total naphthalene contamination has not migrated to the tidal creek.

The approximate extent of TRPH contamination for the February 5, 1992, data is indicated by the solid 5 ppm isocon in Figure 5-9. The area within this line approximates where concentrations of TRPH in groundwater exceeded State target levels in samples collected on February 5, 1992. The April 23, 1992, groundwater analytical data indicate the areal extent and level of TRPH contamination has decreased since February 5, 1992. For example, TRPH concentrations in the samples from well PEN-3810N-MW2 decreased from 54 ppm to 14 ppm. The dotted line on Figure 5-9 is the 5 ppm isocon for the April 23, 1992, analytical data. The areal extent of TRPH contamination has decreased to at least 1/3 of that indicated by the February 5, 1992, data. TRPH contamination exceeded the State target level (5 ppm) only in the sample from well PEN-3810N-MW2. TRPH were not detected in downgradient wells PEN-3810N-MW4, PEN-3810N-MW7, PEN-3810N-MW8, and PEN-3810N-MW9 in the vicinity of the tidal creek.

The compound 1,1,1-trichloroethane was detected in groundwater samples collected from wells PEN-3810N-MW8 and PEN-3810N-MW9 during the April 23, 1992, sampling event. Concentrations of 1,1,1-trichloroethane in samples collected from wells PEN-3810N-MW8 and PEN-3810N-MW11 were 7 ppb and 13 ppb, respectively, and are well below the State drinking water standard of 200 ppb (FDER Chapter 17-550, FAC). 1,1,1-trichloroethane was not detected in the February 5, 1992, samples, and is not considered to be a contaminant of concern at the site.

Methylene chloride was detected in samples collected from eight monitoring wells at the site on April 23, 1992. Methylene chloride concentrations ranged from 4 to 13 ppb. The State recommended guidance concentration for methylene chloride is 5 ppb. The equipment blank, trip blank, and laboratory blanks collected on this date had methylene chloride concentrations as high as 11 ppb. Methylene chloride is a common laboratory contaminant, and its presence in all April 23, 1992, blanks and only one groundwater sample collected on February 5, 1992, indicate it is likely the result of laboratory contamination.

In summary, groundwater contamination at the site is confined to a small and limited area in the vicinity of well PEN-3810N-MW2. Groundwater analytical data indicate total VOA, total naphthalenes, and TRPH contaminant levels in groundwater samples decreased from February 5, 1992, to April 23, 1992. It is possible the decrease in the areal extent and level of contamination may be due to biological processes that occur naturally in the soil. The April 23, 1992, laboratory analytical data indicate that methylene chloride and TRPH are the only identified contaminants present in concentrations exceeding State recommended guidance concentration and target levels. It is likely that methylene chloride is the result of laboratory contamination. TRPH concentrations exceeded the State target level in only the sample from well PEN-3810N-MW2, located in the near vicinity of the former UST location. TRPHs were not detected in downgradient site wells, and do not appear to have migrated offsite.

**5.3 POTABLE WELL SURVEY.** A potable well survey was conducted to assess the risk of contamination to potable water sources from activities at Site 3810N. Two potable supply wells (designated as Well No. 1 and Well No 2 in Figure 5-10) were identified at NAS Pensacola (Wilkins and others, 1985). The NAS Pensacola water supply system is used in conjunction with the Corry Field water supply system, which is located approximately 2 miles north of NAS Pensacola. According to NADEP personnel, these wells are not currently used for potable water supply at NAS Pensacola, but are available as reserve potable water supplies should the need arise.

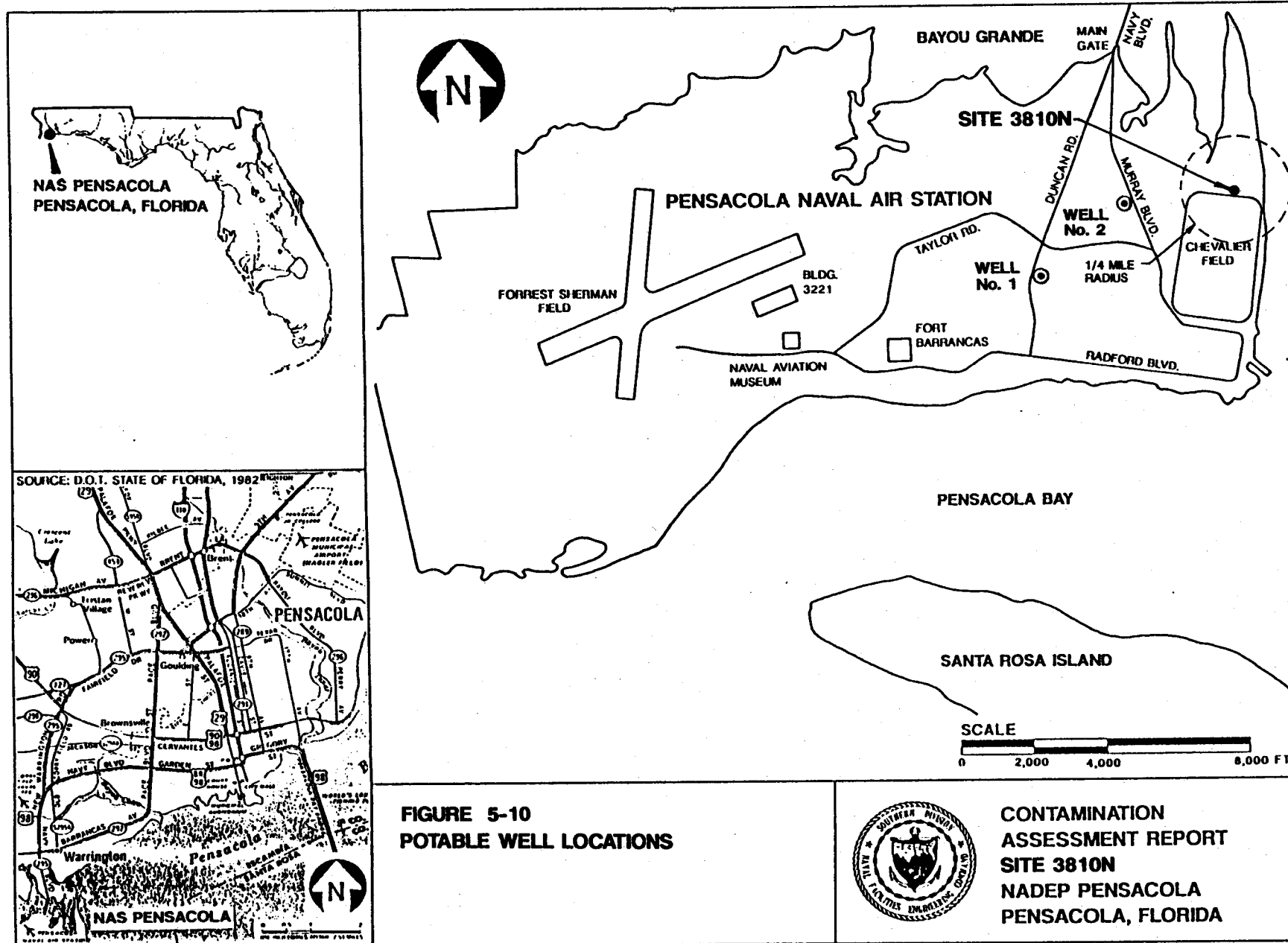
Potable well inventory data are presented in Table 5-5. Both wells at NAS Pensacola are screened in the main producing zone of the sand-and-gravel aquifer at depths ranging from 105 to 160 feet bls. Neither well is located within a 0.25-mile radius of the site and both wells are upgradient to the site. The petroleum contamination at the 3810N site is less than 15 feet bls. Based on this information, the possibility of contamination of potable water sources from the contamination at Site 3810N does not appear feasible.

**Table 5-5**  
**Potable Well Inventory Data,**  
**Naval Air Station, Pensacola Florida**

Contamination Assessment Report  
Site 3810N, Naval Aviation Depot  
Pensacola, Florida

Well Identification Number/Local Name	Location	Total Depth (feet bls)	Screened Interval (feet bls)	Diameter Casing/Screen (inches)
302116087170201/No. 1	Sec. 1,T3S,R30W Duncan and Taylor Roads	174	105-160	24/12
302124087163601/No. 2	Sec. 1,T3S,R30W Murray and Farrar Roads	178	110-160	24/12

Note: bls = below land surface.



## 6.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

6.1 SUMMARY. Based on the results of field data and laboratory analytical results collected during this CA, the following is a summary of conditions at the site.

- The sediments encountered during drilling operations are predominantly comprised of very fine-grained to medium-grained quartz sand. These sediments are part of the surficial zone of the sand-and-gravel aquifer (Roaza and others, 1991).
- Groundwater beneath the site was encountered at depths ranging from approximately 2 to 7 feet bls and is classified as G-II.
- The direction of groundwater flow in the surficial zone is to the north-northeast.
- The calculated average hydraulic gradient across the site is  $1.5 \times 10^{-3}$  ft/ft.
- The calculated average hydraulic conductivity at the site is  $5.0 \times 10^1$  ft/day.
- The calculated average pore water velocity is  $3.0 \times 10^{-1}$  ft/day.
- The reported source of contamination has been removed from the site.
- OVA headspace analyses of soil indicate excessive petroleum contamination in a relatively small area of the site in the vicinity of the former UST location. Soil in the vicinity of the tidal creek north of the site is not petroleum contaminated.
- Methylene chloride, 1,1,1-trichloroethane, fluorene, phenanthrene, ethyl benzene, benzene, xylenes, toluene, 1-methylnaphthalene, 2-methylnaphthalene, naphthalene, and total recoverable petroleum hydrocarbons (TRPH) were identified in groundwater samples collected from site monitoring wells on February 5, 1992, and April 23, 1992.
- Analytical laboratory results of groundwater samples collected April 23, 1992, indicated an overall decrease in the concentrations of contaminants detected in the February 5, 1992, sampling event. The April 23, 1992, analytical results indicate methylene chloride and TRPH are the only groundwater contaminants detected in concentrations exceeding State recommended guidance concentrations or target levels. Methylene chloride is a common laboratory contaminant, and it is likely the laboratory is the source of methylene chloride detected in site groundwater samples. Data from the April 23, 1992, sampling event, indicates that groundwater contamination is restricted to the vicinity of well PEN-3810N-MW2. There is no evidence to indicate contamination from the site has affected the tidal creek.

- No potable water sources were identified within a 0.25-mile radius of the site.

**6.2 CONCLUSIONS.** The level of soil and groundwater contamination identified at Site 3810N exceeds State target levels in a relatively small area in the vicinity of the former UST location. Soil and groundwater contamination at the site is slightly greater than State target levels. The area of soil contamination is minimal and is predominantly covered by asphalt. Groundwater contaminants were not detected in downgradient wells nor do downgradient soils appear to be excessively contaminated. Contamination from Site 3810N is not expected to affect local potable water supplies on the base.

**6.3 RECOMMENDATIONS.** Based on the findings and conclusions discussed above, a *Monitoring Only Plan (MOP)* is recommended for site 3810N. It is recommended that 10 wells (PEN-3810N-MW1, PEN-3810N-MW2, PEN-3810N-MW3, PEN-3810N-MW4, PEN-3810N-MW7, PEN-3810N-MW8, PEN-3810N-MW9, PEN-3810N-MW10D, PEN-3810N-MW11, and PEN-3810N-MW12) be sampled quarterly for a 1-year period according to FDER Chapter 17-770.660, FAC. Wells PEN-3810N-MW5 and PEN-3810N-MW6 should be excluded from the monitoring plan because they are located away from the area of concern, contaminant levels in these wells were minimal, and groundwater flow direction maps indicate they will not be impacted by the contaminated area.

Groundwater samples will be analyzed for VOC by USEPA Methods 601 and 602, for base-neutral and polynuclear aromatic hydrocarbons by USEPA Method 610, and for TRPH by USEPA Method 418.1. Lead and ethylene dibromide analyses are not recommended because these constituents were not detected in any samples collected during this investigation.

Although FDER regulations specify remedial action where excessively petroleum-contaminated soils are detected, soil remediation is not recommended for the following reasons.

- The reported source of contamination has been removed from the site.
- According to FDER guidelines, soil remediation is dependant on the impact of soil contaminants on groundwater (FDER, May 1992).
- It does not appear that the presence of excessively contaminated soil is severely impacting groundwater at the site. Groundwater contaminant concentrations decreased over a 2.5-month period. The most recent sampling analyses indicate contamination exceeding State target levels in only one well at the site, at concentrations slightly above State target levels. Monitoring wells downgradient to the contaminated well show no contamination.
- The area of excessively contaminated soil is mostly covered by asphalt, and human contact with soil contaminants during routine daily site activities appears unlikely. The zone of soil contamination appears to be restricted to a 1-foot thick vertical zone above the water table approximately 4 to 5 feet bls. Based on a 1-foot thick zone, the volume of excessively contaminated soil is estimated to be only 17 cubic yards. As a result of natural biological degradation processes, the level and extent of soil petroleum contamination is expected to decrease with time.

## 7.0 PROFESSIONAL REVIEW CERTIFICATION

The contamination assessment contained in this report was prepared using sound, hydrogeologic principles and judgment. This assessment is based on the geologic investigation and associated information detailed in the text and appended to this report. If conditions are determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of any additional information on the assessment described in this report. This Contamination Assessment Report was developed for the USTs located at Site 3810N at the Naval Aviation Depot, Naval Air Station, Pensacola, Florida, and should not be construed to apply to any other site.

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Roger Durham  
Professional Geologist  
P.G. No. 001127

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Date

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**APPENDIX A**  
**SITE CONDITIONS**

## Regional and Local Physiography

Florida is divided into four physiographic zones; the Coastal Lowlands, the Central Highlands, the Northern Highlands, and the Marianna Lowlands (Puri and Vernon, 1964). The Pensacola area lies entirely within the Coastal Lowlands zone, which closely parallels the Florida coastline. The Coastal Lowlands are further divided into the Atlantic, Distal, and Gulf Coastal Lowlands (Puri and Vernon, 1964). The Naval Aviation Depot (NADEP) Pensacola is located within the Gulf Coastal Lowlands. The lowlands are characterized by poor drainage and elevations less than 100 feet above mean sea level. Landforms include barrier islands, estuaries, coastal ridges, dunes, and valleys (Puri and Vernon, 1964).

Land surface altitudes at NADEP Pensacola range from sea level at the coast to greater than 30 feet above mean sea level. Surface drainage is variable, but is generally toward the nearest body of water.

## Regional Hydrogeology

NADEP Pensacola is underlain by three water bearing zones. These zones include the sand-and-gravel aquifer, the Upper Floridan Aquifer, and the Lower Floridan Aquifer.

The sand-and-gravel aquifer is comprised of Pleistocene terrace deposits, the Pliocene Citronelle Formation (Marsh, 1966), and Miocene coarse clastics. These deposits extend from the surface to a depth of approximately 400 feet below land surface (bls) and are predominantly poorly sorted, fine-grained to coarse-grained sand interbedded with numerous layers of clay and gravel (up to 60 feet thick). There is great lithologic variability in these deposits. Clay lenses and the presence of hardpan layers within the sand-and-gravel aquifer result in the occurrence of perched water tables and artesian conditions in some areas (Musgrove and others, 1965). Groundwater flow is generally topographically controlled. Recharge to the aquifer is derived almost entirely from local rainfall. The sand-and-gravel aquifer is the sole source of potable groundwater in the Pensacola area (Roaza and others, 1991).

The sand-and-gravel aquifer is divided into three major zones: the surficial zone, the low permeability zone, and the main producing zone (Roaza and others, 1991). These designations are based on changes in permeability of the sediments comprising each zone. The surficial zone is the uppermost layer of the aquifer. It consists primarily of sand and gravel with occasional silt and clay deposits. This zone ranges in thickness from 0 to 150 feet (Roaza and others, 1991). The low permeability zone, which underlies the surficial zone, consists of various mixtures of clay, silt, sand, and gravel. Locally, this zone contains poorly sorted sand, with gravel and some clay (Roaza and others, 1991). The thickness of the zone varies from 50 to 100 feet. Individual beds of the low permeability zone are highly discontinuous, and in some areas there may be hydraulic connection between the surficial zone and the main producing zone. The main producing zone is composed of moderate to well sorted sand-and-gravel beds that are typically interbedded with beds of fine-grained sand and clay. Locally, this zone typically contains medium-grained sand and sandy clays (Roaza and others, 1991). The thickness of the main producing zone ranges from 200 to 300 feet.

The Upper Floridan Aquifer is comprised of deposits correlative to the lower Miocene Tampa Formation and the upper Oligocene Chickasawhay Formation. These two formations are undifferentiated in the Pensacola area. Locally, these deposits are approximately 380 feet thick (Marsh, 1966) and are typically brown to light gray, hard, fossiliferous dolomitic limestone or dolomite with a distinctive spongy-looking texture. Locally, the overlying Pensacola Clay is approximately 1,000 feet thick and forms an effective confining unit between the sand-and-gravel aquifer and the Upper Floridan aquifer (Marsh, 1966). This confining unit has also been designated as part of the Intermediate System (Roaza and others, 1991). The Upper Floridan aquifer is recharged by local rainfall in Conecuh, Escambia, and Monroe Counties, Alabama (Healy, 1980). General groundwater flow in the Upper Floridan aquifer is to the southeast toward the Gulf of Mexico (Barr, 1987). The groundwater in the Upper Floridan aquifer is mineralized in the Pensacola area and is not used as a water supply.

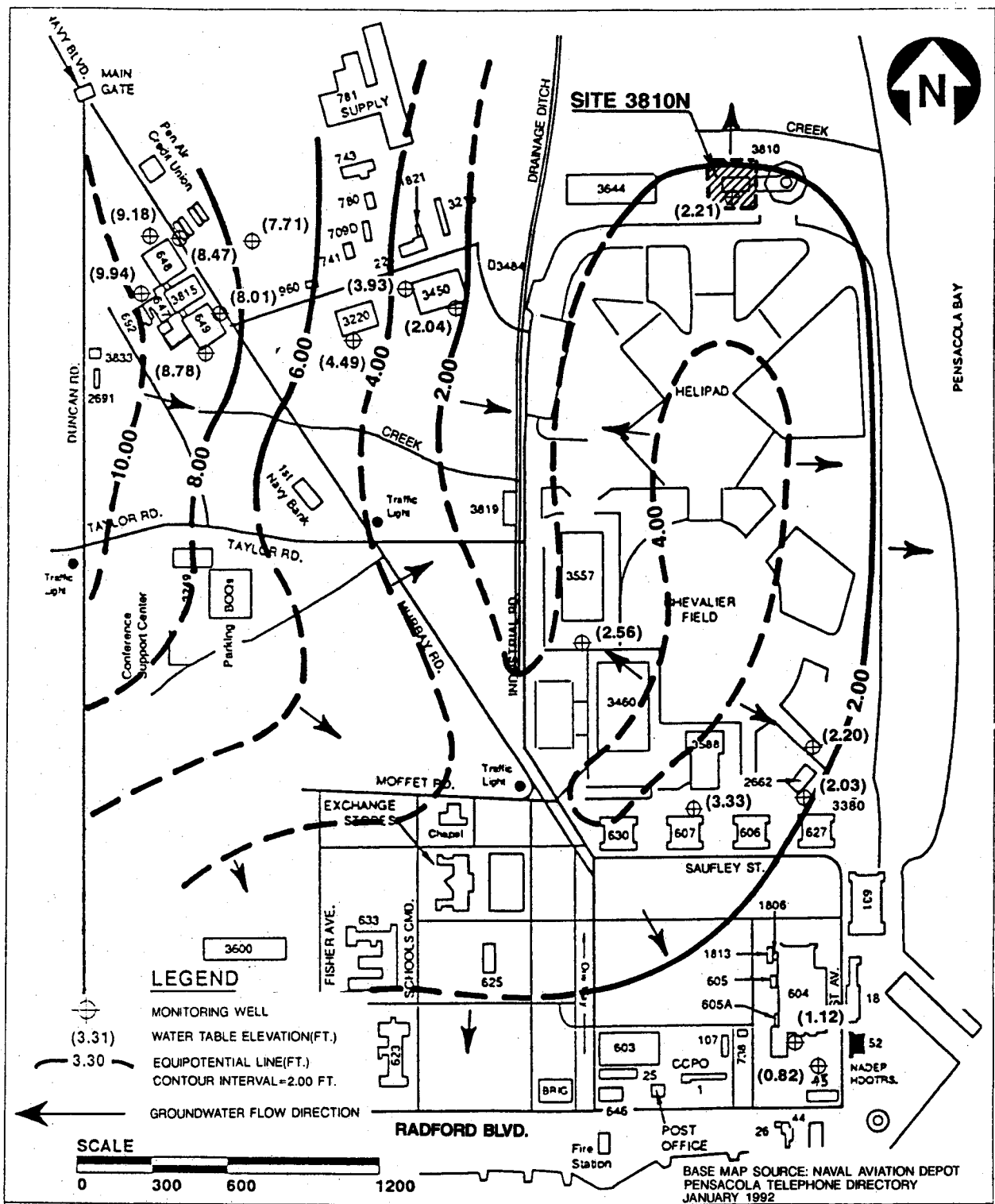
The Lower Floridan aquifer is comprised of upper to middle Eocene limestones. The aquifer is approximately 500 feet thick in the vicinity (Marsh, 1966). The limestones are typically white to grayish cream, soft, and chalky. The Lower Floridan aquifer is confined from above by the Bucatunna Clay Member of the middle Oligocene Byram Formation and from below by gray shales and clays of middle Eocene age. The Bucatunna Clay, also called the Intermediate Zone, is approximately 170 feet thick in the Pensacola area (Musgrove and others, 1965). Groundwater flow in the aquifer is to the southeast toward the Gulf of Mexico (Healy, 1980). The water quality is poor because of high mineralization.

#### Local Hydrogeology

The surficial zone of the sand-and-gravel aquifer is the interval of primary concern at NAS Pensacola. The surficial zone extends from the surface to a depth of approximately 100 feet bls (Roaza and others, 1991). Soils from 0 to 50 feet bls encountered in investigations performed by ABB-ES at the NADEP facility are generally composed of fine-grained to very fine-grained sand, with very little silt and clay. Occasional coarse-grained sand to fine-grained gravel were encountered, and thin peat layers were found at NAS Pensacola in the Sherman Field vicinity.

Groundwater in the surficial zone is non-artesian and is encountered at depths ranging from less than 2 feet bls to greater than 20 feet bls at the NADEP facility. The depth to groundwater is mainly controlled by topography. Recharge is predominantly from local rainfall.

Figure A-1 shows the groundwater flow direction in the site vicinity on March 30, 1992. The direction of groundwater flow in the site vicinity is predominantly to the east, although variations in topography and the presence of surface water bodies result in localized changes in the groundwater flow direction. For example, groundwater flow is northerly at the north end of Chevalier Field and appears to be influenced by a tidal creek north of Building 3810. A southerly flow toward Pensacola Bay is indicated along Radford Boulevard in the southwest area shown on Figure A-1. A westerly flow was observed near the 3557 Building area on the west edge of Chevalier Field toward a drainage ditch along the west side of Industrial Road. The reversal of the predominantly eastern flow near Building 3557 results in an apparent piezometric "high" in the central part of Chevalier Field.



**FIGURE A-1**  
**WATER TABLE ELEVATION CONTOUR MAP**  
**SURFICIAL ZONE,**  
**SAND-AND-GRAVEL AQUIFER**  
**MARCH 30, 1992**



**CONTAMINATION**  
**ASSESSMENT REPORT**  
**SITE 3810N**  
**NADEP PENSACOLA**  
**PENSACOLA, FLORIDA**

Perched water tables were observed in the Sherman Field area, approximately 2 miles west of the site. Perched water tables are apparently the result of lower permeability peat layers found in this area. Perched water tables were not observed in the vicinity of Site 3810N.

Locally, hydraulic gradients in the surficial zone vary from approximately  $1 \times 10^{-3}$  feet per foot (ft/ft) to  $7 \times 10^{-3}$  ft/ft. Gradients are generally less in the lower flat-lying areas than in the topographically higher areas to the northwest of Chevalier Field. Additional water level measurements, taken on numerous occasions at low-elevation sites located near Pensacola Bay, indicate tidal fluctuations do not appear to alter the groundwater flow direction and do not appear to have a great effect on hydraulic gradients at NAS Pensacola.

**APPENDIX B**  
**LITHOLOGIC LOGS**

TITLE: NADEP Pensacola				LOG of WELL: 3810N MW-1		BORING NO. SB1	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/11/92		COMPLTD: 1/11/92	
METHOD: 4.25" ID HSA		CASE SIZE: 2 inch		SCREEN INT.: 3-13 FT.		PROTECTION LEVEL: D	
TOC ELEV.: 8.55 FT.		MONITOR INST.: OVA		TOT DPTH: 13FT.		DPTH TO $\nabla$ 6.40 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/12/92				SITE: 3810N	

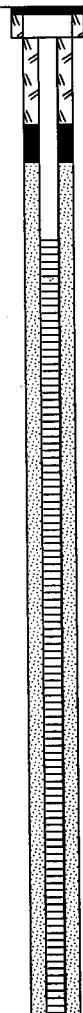
DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0.0				SAND: Brown to tan to orange, very fine to fine grained.		SP		
				CLAYEY SAND: Reddish brown, very fine to fine grained.		SC		
5		1.2/2	16.0	SAND: Orange-brown, very fine to fine grained, diesel odor, moist.		SP	3,2,8,11	
				SAND: Off-white to gray, appears wet, strong diesel odor.				
10		1.3/2		SAND: Off-white to light brown, fine to medium grained, diesel odor, wet.		SP	9,25,33,24	
15		1.0/2		SAND: Tan, very fine to medium grained, possible faint odor, wet.		SP	7,7,8,8	




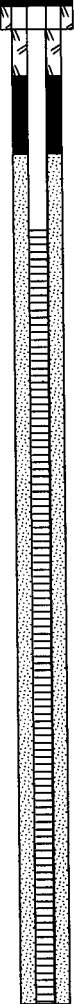
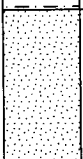
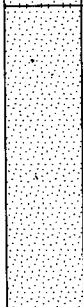
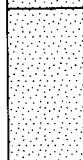
TITLE: NADEP Pensacola				LOG of WELL: 3810N MW-2		BORING NO. SB2	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/11/92		COMPLTD: 1/11/92	
METHOD: 4.25" ID HSA		CASE SIZE: 2 inch		SCREEN INT.: 3-13 FT.		PROTECTION LEVEL: D	
TOC ELEV.: 7.68 FT.		MONITOR INST.: OVA		TOT DPTH: 13FT.		DPTH TO $\nabla$ 5.56 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/12/92				SITE: 3810N	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0.0	SAND: Orange-red, silty, some clay.		SM		
5			1.5/2	2.0	SAND: Orange-brown to light tan, very fine to fine grained, slight diesel odor, some discoloration at base.		SP	4,9,12,12	
10			1.5/2	-	CLAYEY SAND: Orange-red, wet.		SC		
					SAND: Off white, very fine to fine grained, wet.		SP	9,16,18,20	
15									



TITLE: NADEP Pensacola		LOG of WELL: 3810N MW-11	BORING NO. SB3
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL		DATE STARTED: 4/8/92	COMPLTD: 4/8/92
METHOD: 4" Hand Auger	CASE SIZE: 2 inch	SCREEN INT.: 3-13 FT.	PROTECTION LEVEL: D
TOC ELEV.: 7.46 FT.	MONITOR INST.: OVA	TOT DPTH: 13FT.	DPTH TO $\nabla$ 5.34 FT.
LOGGED BY: R. Durham	WELL DEVELOPMENT DATE: 4/8/92		SITE: 3810N

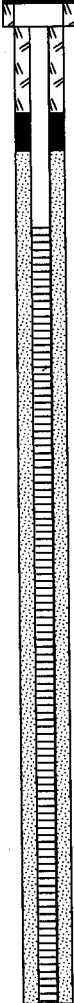
DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0.0	SAND: Reddish brown, clayey.		SC		
				0.0					
					SAND: Light gray to off-white, very fine to fine grained, strong diesel odor.		SP		
5				103.0	SAND: Off-white to brown-red, very fine to fine grained, strong diesel odor, wet.		SP		
				-	SAND: Light brown, very fine to fine grained, strong diesel odor, wet.		SP		
10									
15									

TITLE: NADEP Pensacola		LOG of WELL: 3810N MW-3	BORING NO. SB4
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7527-30
CONTRACTOR: Groundwater Protection Inc./Orlando, FL		DATE STARTED: 1/12/92	COMPLTD: 1/12/92
METHOD: 4.25" ID HSA	CASE SIZE: 2 inch	SCREEN INT.: 3-13 FT.	PROTECTION LEVEL: D
TOC ELEV.: 8.33 FT.	MONITOR INST.: OVA	TOT DPTH: 13FT.	DPTH TO $\nabla$ 5.40 FT.
LOGGED BY: R. Durham	WELL DEVELOPMENT DATE: 1/12/92		SITE: 3810N

DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0.0	SAND: Orange-brown to tan, very fine to fine grained.		SP		
5			1.3/2	0.0	SAND: Tan to light gray, some darker sand present, very fine to fine grained.		SP	7,7,8,8	
10			1.2/2	44.0	SAND: Orange-brown to brown-gray, very fine to fine grained, wet.		SP	8,10,12,22	
15									

TITLE: NADEP Pensacola				LOG of WELL: 3810N MW-4		BORING NO. SB5	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/12/92		COMPLTD: 1/12/92	
METHOD: 4.25" ID HSA		CASE SIZE: 2 inch		SCREEN INT.: 3-13 F.T.		PROTECTION LEVEL: D	
TOC ELEV.: 8.54 FT.		MONITOR INST.: OVA		TOT DPTH: 13FT.		DPTH TO $\nabla$ 4.71 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/13/92				SITE: 3810N	

DEPTH F.T.	LABORATORY SAMPLE ID.	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			0.0	SAND		SP		
5		1.8/2	10.0	SAND: Light gray to brown, fine to medium grained, some mica, bottom of spoon saturated.		SP	5,6,6,12	
10		2.0/2	13.0	SAND: Light gray to reddish tan, fine to medium grained, some clay and silt, some mica, saturated.		SP	6,24,21,33	
15								

TITLE: NADEP Pensacola				LOG of WELL:		BORING NO. SB6	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/13/92		COMPLTD: 1/13/92	
METHOD: 4.25" ID HSA		CASE SIZE: NA		SCREEN INT.: NA		PROTECTION LEVEL: D	
TOC ELEV.: FT.		MONITOR INST.: OVA		TOT DPTH: 11FT.		DPTH TO V FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: NA				SITE: 3810N	

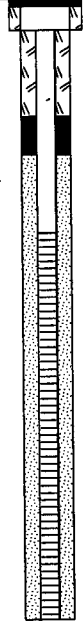
  

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0.0	CLAYEY SAND: Reddish-brown, very fine to fine grained.		SC		
					SAND: Brown to orange-brown, very fine to fine grained, some clay.		SP		
5			2.0/2	0.0	SAND: Orange-red to reddish-brown, very fine to fine grained.		SP	6,10,14,14	
					SAND: Off-white to light gray, very fine to fine grained, damp.				
10			1.5/2	6.0	SAND: Reddish-brown (9-10') to off-white (10-11'), very fine to fine grained, wet.			7,13,23,30	
15									
20									

TITLE: NADEP Pensacola				LOG of WELL: 3810N MW-5				BORING NO. SB7			
CLIENT: SOUTHNAVFACENGCOM								PROJECT NO: 7527-30			
CONTRACTOR: Groundwater Protection Inc./Orlando, FL						DATE STARTED: 1/20/92				COMPLTD: 1/20/92	
METHOD: 4.25" ID HSA				CASE SIZE: 2 inch		SCREEN INT.: 3-13 FT.		PROTECTION LEVEL: D			
TOC ELEV.: 10.41 FT.				MONITOR INST.: OVA		TOT DPTH: 13FT.		DPTH TO $\nabla$ 6.54 FT.			
LOGGED BY: R. Durham				WELL DEVELOPMENT DATE: 1/21/92				SITE: 3810N			
DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA		
				0.0	CLAYEY SAND: Reddish-brown to yellow-brown, very fine to fine grained.		SC				
					SAND: Brown, very fine to fine grained.		SP				
5			1.5/2	0.0	SAND: Reddish-brown to light brown, very fine to fine grained.		SP	2,3,4,12			
10			2.0/2	-	SAND: Light brown to white, very fine to fine grained, sulfur odor, wet.		SP	15,20,20,30			
15											

TITLE: NADEP Pensacola		LOG of WELL: 3810N MW-6	BORING NO. SB8
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7527-30
CONTRACTOR: Groundwater Protection Inc./Orlando, FL		DATE STARTED: 1/20/92	COMPLTD: 1/20/92
METHOD: 4.25" ID HSA	CASE SIZE: 2 inch	SCREEN INT.: 3-13 FT.	PROTECTION LEVEL: D
TOC ELEV.: 8.63 FT.	MONITOR INST.: OVA	TOT DPTH: 13FT.	DPTH TO $\nabla$ 6.39 FT.
LOGGED BY: R. Durham	WELL DEVELOPMENT DATE: 1/21/92		SITE: 3810N

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0.0	CLAYEY SAND: Reddish-brown, very fine to fine grained.		SC		
				0.0	SAND: Tan to light brown, very fine to fine grained.		SP		
				0.0	SAND: Tan to brown, very fine to fine grained.		SP	4,10,11,14	
5			1.3/2						
10			1.9/2	-	SAND: Reddish-brown (10-10.6') to off-white (10.6-12'), very fine to fine grained, slight sulfur odor, wet.		SP	4,8,15,18	
15									

TITLE: NADEP Pensacola				LOG of WELL: 3810N MW-7				BORING NO. SB9			
CLIENT: SOUTHNAVFACENGCOM								PROJECT NO: 7527-30			
CONTRACTOR: Groundwater Protection Inc./Orlando, FL						DATE STARTED: 1/20/92				COMPLTD: 1/20/92	
METHOD: 4.25" ID HSA			CASE SIZE: 2 inch			SCREEN INT.: 3-8 FT.			PROTECTION LEVEL: D		
TOC ELEV.: 5.08 FT.			MONITOR INST.: OVA			TOT DPTH: 8FT.			DPTH TO $\nabla$ 2.98 FT.		
LOGGED BY: R. Durham			WELL DEVELOPMENT DATE: 1/21/92						SITE: 3810N		
DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA		
0.0					SAND: Light brown to reddish-brown, very fine to fine grained.		SP				
5											
10											
15											

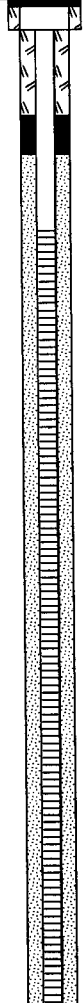


TITLE: NADEP Pensacola				LOG of WELL: 3810N MW-8				BORING NO. SB10			
CLIENT: SOUTHNAVFACENGCOM								PROJECT NO: 7527-30			
CONTRACTOR: Groundwater Protection Inc./Orlando, FL						DATE STARTED: 1/20/92				COMPLTD: 1/20/92	
METHOD: 4.25" ID HSA			CASE SIZE: 2 inch			SCREEN INT.: 3-13 FT.			PROTECTION LEVEL: D		
TOC ELEV.: 5.79 FT.			MONITOR INST.: OVA			TOT DPTH: 13FT.			DPTH TO $\nabla$ 3.67 FT.		
LOGGED BY: R. Durham			WELL DEVELOPMENT DATE: 1/21/92						SITE: 3810N		
DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA		
5				0.0	SAND: Light brown to reddish-brown, very fine to fine grained.		SP				
10				0.0							
15											

TITLE: NADEP Pensacola				LOG of WELL:		BORING NO. SB11			
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30			
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/20/92		COMPLTD: 1/20/92			
METHOD: 4.25" ID HSA		CASE SIZE: NA		SCREEN INT.: NA		PROTECTION LEVEL: D			
TOC ELEV.: FT.		MONITOR INST.: OVA		TOT DPTH: 4FT.		DPTH TO $\nabla$ FT.			
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: NA				SITE: 3810N			
DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
4.0					SAND: Reddish-brown, very fine to fine grained.		SP		
5									
10									
15									

TITLE: NADEP Pensacola				LOG of WELL: 3810N MW-9				BORING NO. SB12			
CLIENT: SOUTHNAVFACENGCOM								PROJECT NO: 7527-30			
CONTRACTOR: Groundwater Protection Inc./Orlando, FL						DATE STARTED: 1/20/92		COMPLTD: 1/20/92			
METHOD: HSA			CASE SIZE: 2 inch			SCREEN INT.: 3-13 FT.		PROTECTION LEVEL: D			
TOC ELEV.: 6.44 FT.			MONITOR INST.: OVA			TOT DPTH: 13FT.		DPTH TO $\nabla$ 4.34 FT.			
LOGGED BY: R. Durham			WELL DEVELOPMENT DATE: 1/21/92					SITE: 3810N			

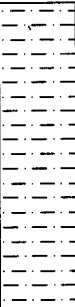
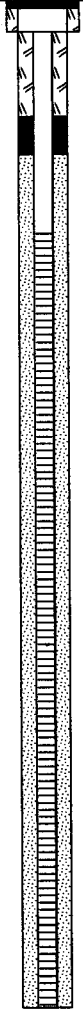

  

DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
<div style="text-align: center;">5</div> <div style="text-align: center;">10</div> <div style="text-align: center;">15</div>				5.0	SAND: Reddish-brown, very fine to fine grained.		SP		

TITLE: NADEP Pensacola			LOG of WELL: 3810N MW-10D		BORING NO. SB13	
CLIENT: SOUTHNAVFACENGCOM					PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL			DATE STARTED: 1/21/92		COMPLTD: 1/21/92	
METHOD: 4.25" ID HSA		CASE SIZE: 2 inch		SCREEN INT.: 15-20 FT.		PROTECTION LEVEL: D
TOC ELEV.: 7.58 FT.		MONITOR INST.: OVA		TOT DPTH: 20FT.		DPTH TO $\nabla$ 5.46 FT.
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/24/92			SITE: 3810N	

DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			0.0	CLAYEY SAND: Red, some silt.	[Symbol]	SC		
5		1.5/2	95.0	SAND: Brown to gray, fine to medium grained, some silt and clay.	[Symbol]	SP	7,10,10,14	
10		1.9/2	3.0	CLAYEY SAND: Reddish-brown, wet. SAND: Brown-gray, very fine to fine grained wet, slight odor.	[Symbol]	SC	8,13,13,12	
15		1.7/2	0.0	SAND: Brownish-gray to reddish-brown, very fine to fine grained, wet.	[Symbol]	SP	8,13,15,19	
20		1.8/2	0.0		[Symbol]		5,10,13,14	
25		1.9/2	0.0	SAND: Light brown to off-white, very fine to fine grained, wet.	[Symbol]		9,17,19,26	

TITLE: NADEP Pensacola				LOG of WELL: 3810N MW-12				BORING NO. SB14			
CLIENT: SOUTHNAVFACENGCOM								PROJECT NO: 7527-30			
CONTRACTOR: Groundwater Protection Inc./Orlando, FL						DATE STARTED: 4/8/92				COMPLTD: 4/8/92	
METHOD: HSA				CASE SIZE: 2 inch		SCREEN INT.: 3-13 FT.		PROTECTION LEVEL: D			
TOC ELEV.: 7.55 FT.				MONITOR INST.: OVA		TOT DPTH: 13FT.		DPTH TO $\nabla$ 5.44 FT.			
LOGGED BY: R. Durham				WELL DEVELOPMENT DATE: 4/8/92				SITE: 3810N			
DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA		
					CLAYEY SAND: Red-brown to brown.		SC				
5				70.0	SAND: brown to gray, fine grained, strong odor.		SP				
10											
15											

## **APPENDIX C**

### **INVESTIGATIVE METHODOLOGIES AND PROCEDURES**

### Soil Boring Methods

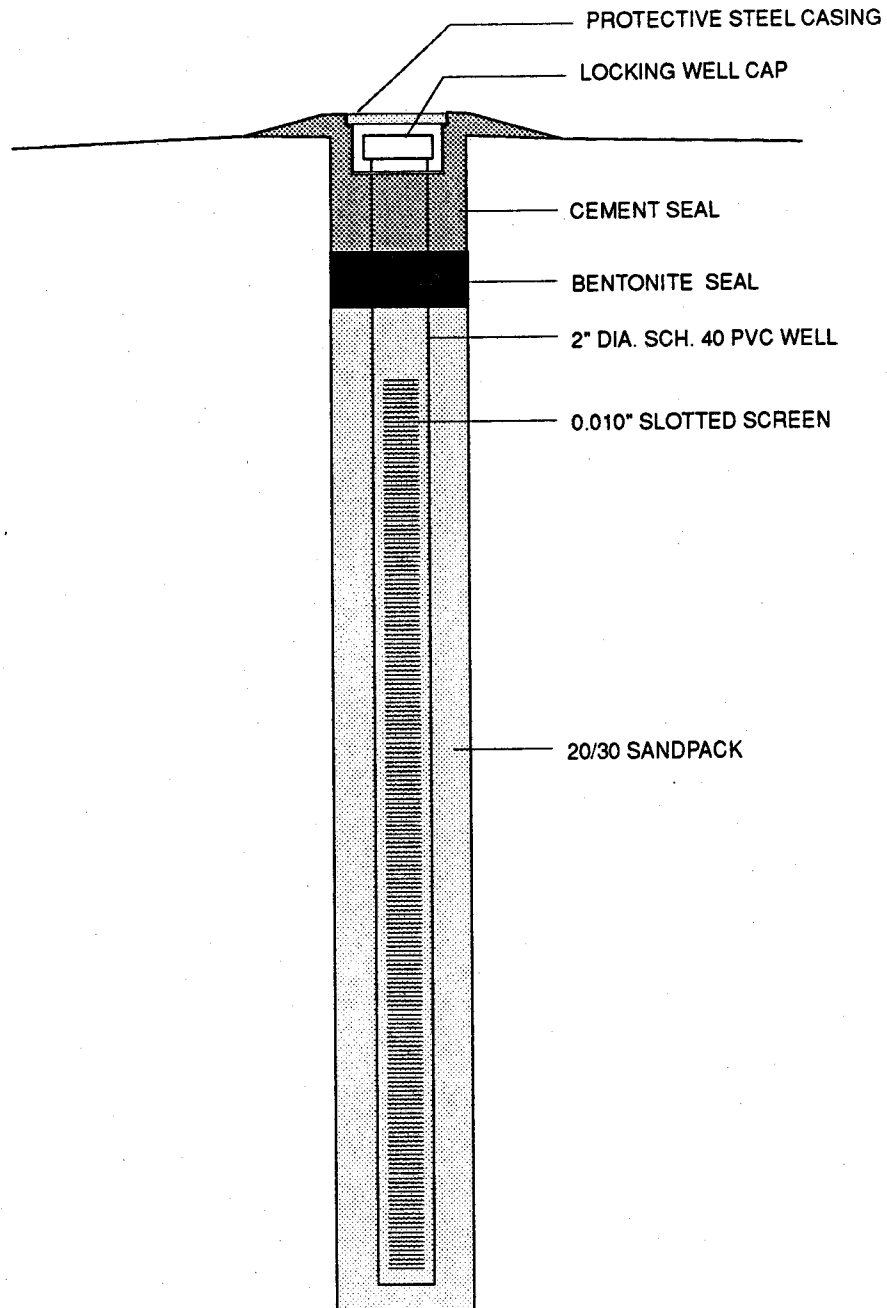
Boreholes were advanced using 4.25-inch inside diameter (ID), hollow-stem augers using a rotary drill rig. Soil samples were collected from each borehole using a standard penetration test (SPT) split-spoon sampler. SPT samples were generally collected at 5-foot intervals to the total depth of the well. The soil samples collected above the water table were placed in 16-ounce glass jars and head space analyses were performed using an organic vapor analyzer (OVA) with a flame ionization detector (FID) following Florida Department of Environmental Regulation (FDER) Chapter 17-770.200(2), Florida Administrative Code (FAC), guidelines. Soil samples from below the water table were analyzed using a portable gas chromatograph (GC) calibrated to detect benzene, ethyl benzene, toluene, and xylene (BETX) to the part per billion (ppb) level. The purpose of the screening procedure was to optimize monitoring well placement during the investigation.

### Monitoring Well Construction

Monitoring wells were installed in many of the boreholes drilled at the NADEP facility. All monitoring wells installed during the investigation were constructed of 2-inch ID, schedule 40, polyvinyl chloride (PVC) casing with flush-threaded joints and 0.010-inch machine-slotted screen. Shallow wells were constructed with 10 feet of screen. Deeper wells were constructed with 5 feet of screen. PVC well casings extend from the top of the screen to land surface. A 20/30 grade silica sand filter pack was placed in the annular space to approximately 2 to 3 feet above the top of the screen. A 1- to 2-foot thick bentonite seal was then placed on top of the filter pack. The remaining annular space was grouted to the surface with a neat cement grout. A protective traffic-bearing vault was installed to complete each well location. In concreted areas, the well pad consisted of 6-inch thick reinforced concrete around the traffic-bearing vault to the depth of the surrounding concrete. Each monitoring well is equipped with a locking well cap and a padlock. Figure C-1 depicts a typical shallow monitoring well installation for the site.

### Water Level Measurements

Groundwater levels were measured using an electric water level indicator and an engineering tape divided into increments of 0.01 foot. The wells were checked for the presence of free product by visual observation of a groundwater sample taken from each well using an extruded Teflon™ bailer. Water level elevations were calculated by subtracting the measured depth to groundwater from the elevation at the top of the well casing.



**FIGURE C-1**  
**MONITORING WELL**  
**CONSTRUCTION DIAGRAM**



**CONTAMINATION**  
**ASSESSMENT REPORT**  
**SITE 3810N**  
**NADEP PENSACOLA**  
**PENSACOLA, FLORIDA**



### Groundwater Sampling

Groundwater samples were collected in accordance with ABB Environmental Services, Inc. (ABB-ES), Florida Department of Environmental Regulation (FDER)-approved Comprehensive Quality Assurance Plan (CompQAP). The monitoring wells were purged with a Teflon™ bailer. Purging continued until a minimum of three well volumes had been removed from the well. Groundwater samples were collected using an extruded Teflon™ bailer. The samples were placed into appropriate containers, properly preserved, and placed on ice. Conductivity, pH, and temperature were measured at the time of sampling. Samples were then shipped to Wadsworth/ALERT Laboratories, Inc., in Tampa, Florida. All groundwater samples collected were analyzed for waste oil and unknown constituents as outlined in FDER Chapter 17-770, FAC.

### Slug Test Procedures

The slug test developed by Bouwer and Rice (1976) measures the saturated hydraulic conductivity (K) using a single well. The test method used is termed a "rising head" test and is performed by quickly withdrawing a volume of water (slug) from the well and measuring the subsequent rate of the rising water level in the well. Bouwer (1989) recommends the rising head slug test for wells with screened intervals that are only partially submerged or partially penetrate unconfined aquifers.

The slug was constructed of 1-inch outside diameter PVC pipe, 5 feet in length, filled with sand, and capped watertight at both ends. The water level changes in the monitoring wells were recorded using a data logger and pressure transducer. The pressure transducer was suspended less than 1 foot above the bottom of the well and an initial water level was recorded prior to beginning the test. The slug was then lowered into the well to a depth below the original water table. Water levels were then observed until they stabilized at the original level. Generally, recovery occurred within 3 to 4 seconds. Following stabilization, the slug was quickly removed and water level measurements were recorded over time until the water level returned to the original level. Three rising head tests were conducted for each well in order to obtain an average recovery response.

**APPENDIX D**  
**AQUIFER PARAMETER CALCULATIONS**

## Aquifer Parameter Calculations

### Hydraulic gradient

Water table elevations were plotted on a map of the site. A water table contour map was drawn with flow lines (depicting groundwater flow direction) perpendicular to the groundwater elevation contours. The average groundwater hydraulic gradient was calculated by subtracting the differences in groundwater elevation (in feet) between two points on the map and dividing the elevation difference by the distance between the two points to obtain a resulting gradient in feet per foot. Water elevation data collected on February 6 and March 31, 1992, were used to calculate hydraulic gradients at the site. For each date, three traverses were made perpendicular to equipotential contour lines to calculate an average site hydraulic gradient. For each traverse, the hydraulic gradient was calculated as follows:

$$i = \frac{(h_1 - h_2)}{d} \quad (1)$$

where

- i = hydraulic gradient (feet per foot [ft/ft]),
- $h_1$  = water table elevation, upgradient (feet),
- $h_2$  = water table elevation, downgradient (feet), and
- d = horizontal distance (feet) between  $h_1$  and  $h_2$  along a flow line.

Hydraulic gradients calculated in this manner varied from  $1.2 \times 10^{-3}$  ft/ft to  $1.8 \times 10^{-3}$  ft/ft. The average hydraulic gradient at the site was calculated to be  $1.5 \times 10^{-3}$  ft/ft.

### Hydraulic conductivity

Hydraulic conductivity from slug test data was calculated following the methods of Bouwer and Rice (1976) and Bouwer (1989) for partially penetrating wells screened in unconfined aquifers. The following well information was needed to assess the hydraulic conductivity:

- radius of well casing ( $r_c$ ),
- $r_w$  = radius of borehole ( $r_c$  plus radius of the sand pack surrounding the well screen),
- length of screened interval below the water table ( $L_s$ ),
- effective well radius ( $r_e$ ),
- depth of well below the water table ( $L_w$ ),
- depth to confining unit or bottom of aquifer below the static water table (H), and

- plot of time versus the logarithm of y, where y is the difference between the static water level outside the well and the water level inside the well.

Figure D-1 is a well diagram depicting most of the aquifer and well parameters. Calculations were made assuming that  $L_w < H$ . Hydraulic conductivity, K, was calculated as follows:

$$K = [R_c^2 \ln(\frac{r_e}{r_w}) - 2L_w] [\frac{1}{t} \ln(\frac{y_0}{y_t})] \quad (2)$$

where

$y_0$  = y at time zero, and  
 $y_t$  = y at time t.

The effective well radius,  $r_e$ , and the term  $[(1/t)\ln(y_0/y_t)]$  were derived by using the computer program AQTESOLV™ (Geraghty & Miller, Inc., 1989). This computer program follows procedures and assumptions outlined by Bouwer (1989).

Slug test graphs are attached at the end of this appendix. Values of y were calculated for a particular time, t, and plotted on the graph. The computer program selects a "best-fit" line through the data points by linear regression along a "straight-line" portion of the graph. The slope of the "best-fit" line is used to calculate the hydraulic conductivity, K.

Three slug tests each were performed inside wells PEN-3810N-MW4, PEN-3810N-MW6, and PEN-3810N-MW10D. Hydraulic conductivity, K, is reported in feet per minute (ft/min) on the slug test graphs, and was recalculated to feet per day (ft/day). K was found to vary from  $3.7 \times 10^1$  ft/day to  $7.9 \times 10^1$  ft/day with an average K of  $5.0 \times 10^1$  ft/day.

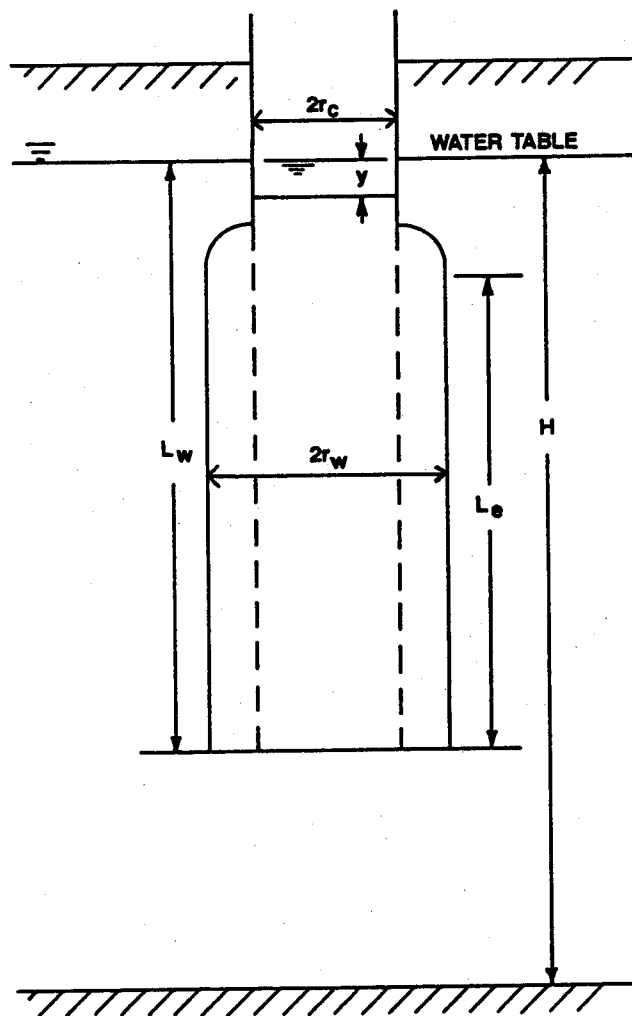
#### Average pore water velocity

Estimates of average pore water velocity were obtained using the following formula:

$$V = \frac{(K \cdot i)}{n} \quad (3)$$

where

V = seepage velocity in ft/day,  
 K = hydraulic conductivity in ft/day,  
 i = hydraulic gradient, and  
 n = estimated porosity.



- $r_c$  - radius of well.
- $r_w$  - radius of well + total thickness of the sand/gravel pack.
- $L_e$  - length of screened interval below the water table.
- $L_w$  - depth of well below water table.
- $H$  - depth to confining unit below the water table.
- $y$  - difference between static water level outside well and water level inside well.

**FIGURE D-1**  
**DEFINITIONS OF SLUG TEST**  
**PARAMETERS (from Bouwer, 1989)**



**CONTAMINATION**  
**ASSESSMENT REPORT**  
**SITE 3810N**  
**NADEP PENSACOLA**  
**PENSACOLA, FLORIDA**

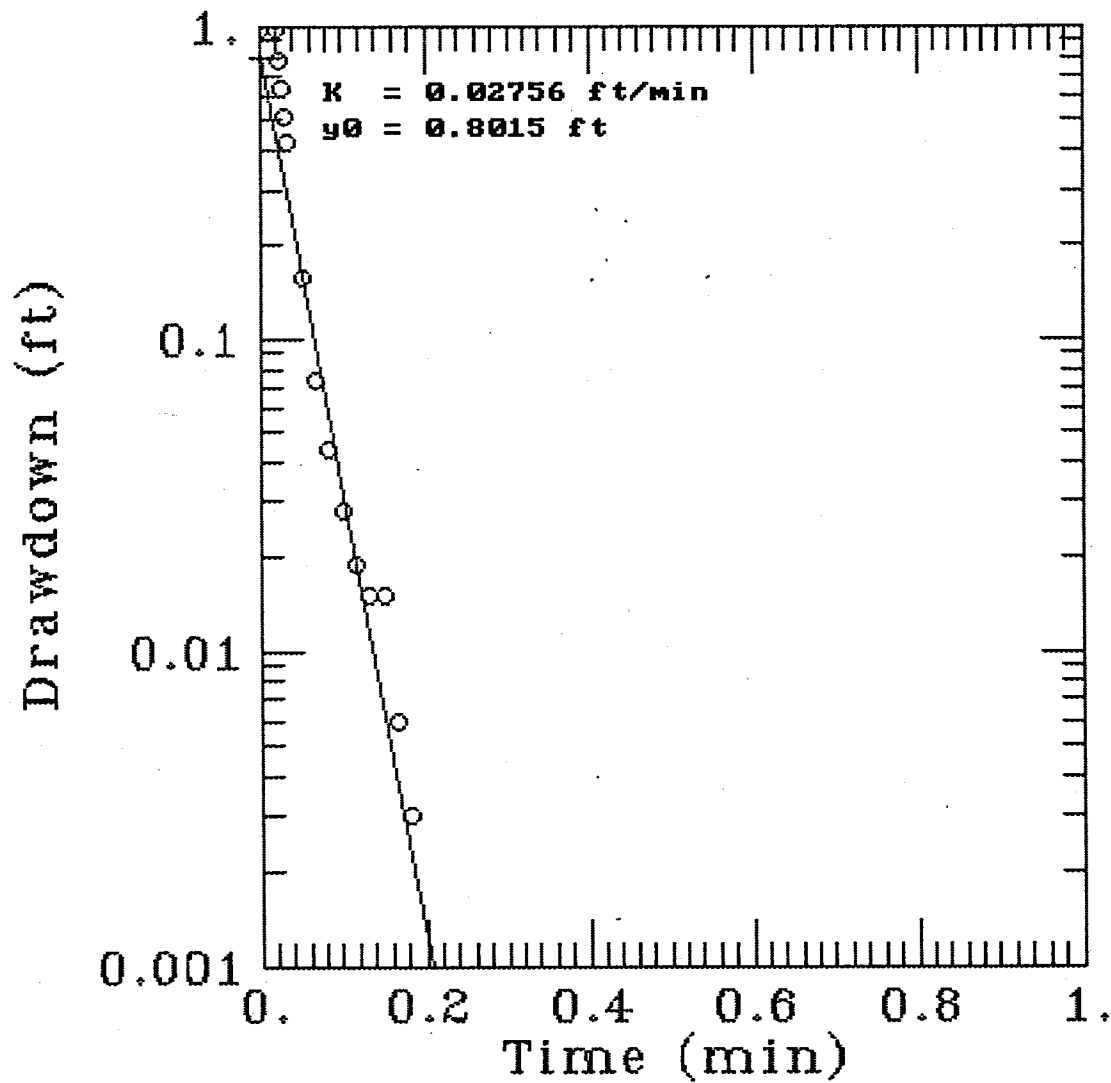
Assuming an estimated porosity of 25 percent, an average hydraulic gradient of  $1.5 \times 10^{-3}$ , and an average hydraulic conductivity of  $5.0 \times 10^1$  ft/day, the average pore water velocity is calculated as follows:

$$v = \frac{5.0 \times 10^1 \text{ ft/day} \times 1.5 \times 10^{-3} \text{ ft/ft}}{0.25}$$

$$v = 3.0 \times 10^{-1} \text{ ft/day}$$

## **SLUG TEST PLOTS**

# PEN-3810N-MW-4 RUN #1



AQTESOLV



GERAGHTY  
& MILLER, INC.



Modeling Group



=====

A Q T E S O L V    R E S U L T S  
Version 1.10

08/10/92

14:05:27

=====

TEST DESCRIPTION

Data set..... A:3810N41.SET  
Data set title..... PEN-3810N-MW-4 RUN #1

Knowns and Constants:

No. of data points..... 14  
Radius of well casing..... 0.083  
Radius of well..... 0.334  
Aquifer saturated thickness..... 8.31  
Well screen length..... 10  
Static height of water in well..... 8.31  
Log (Re/Rw)..... 2.451  
A, B, C..... 0.000, 0.000, 1.967

=====

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

=====

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

Estimate  
K = 2.7967E-002  
y0 = 0.0000E+000

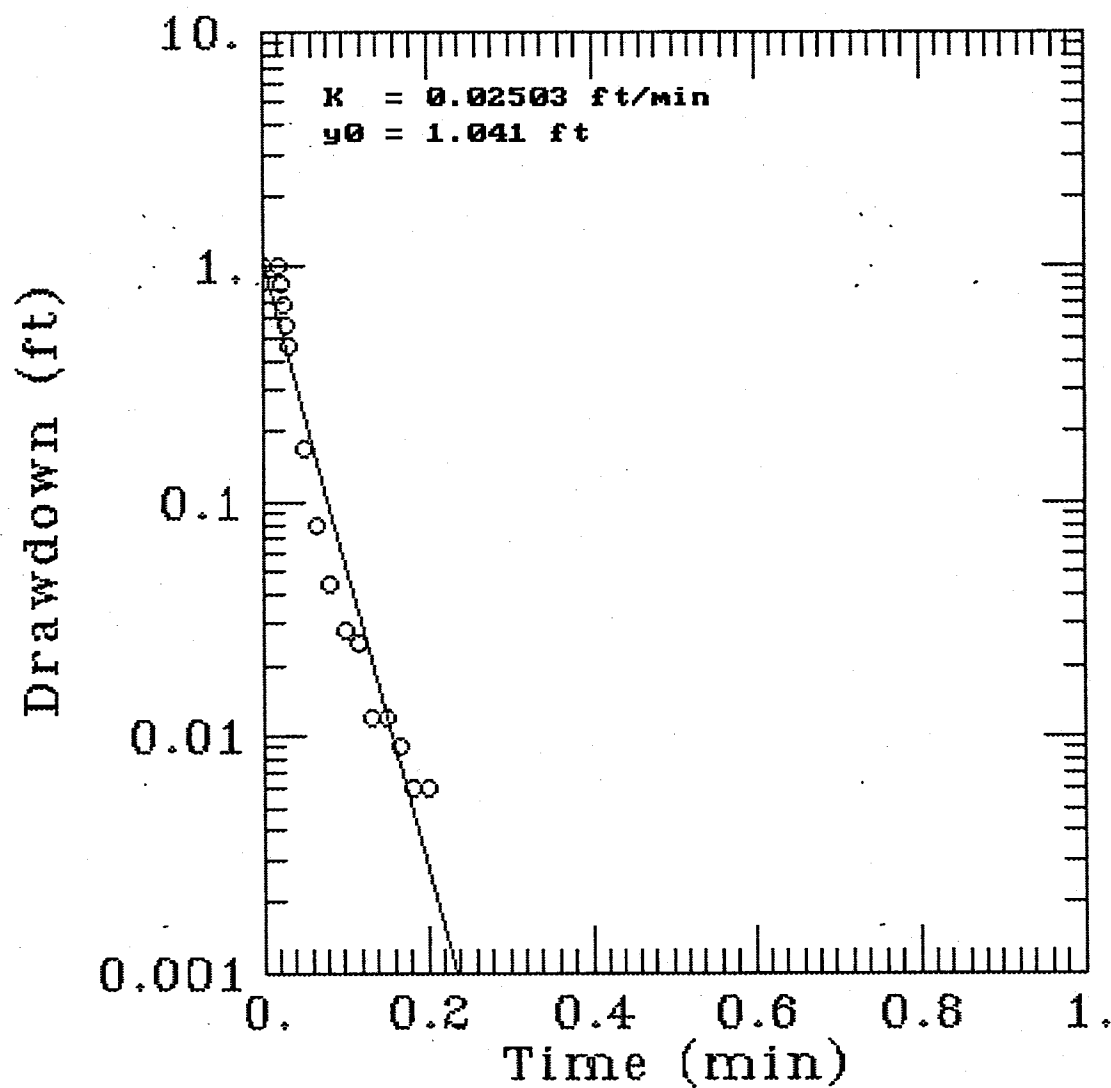
=====

TYPE CURVE DATA

K = 2.75641E-002  
y0 = 8.01505E-001

Time	Drawdown	Time	Drawdown	Time	Drawdown
-----	-----	-----	-----	-----	-----
0.000E+000	8.015E-001	1.000E+000	5.325E-015		

# PEN-3810N-MW-4 RUN #2



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=====

A Q T E S O L V    R E S U L T S  
Version 1.10

08/10/92

14:10:50

=====

TEST DESCRIPTION

Data set..... A:3810N42.SET  
Data set title..... PEN-3810N-MW-4 RUN #2

Knowns and Constants:

No. of data points..... 15  
Radius of well casing..... 0.083  
Radius of well..... 0.334  
Aquifer saturated thickness..... 8.31  
Well screen length..... 10  
Static height of water in well..... 8.31  
Log (Re/Rw)..... 2.451  
A, B, C..... 0.000, 0.000, 1.967

=====

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

=====

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

Estimate  
K = 2.5028E-002  
y0 = 0.0000E+000

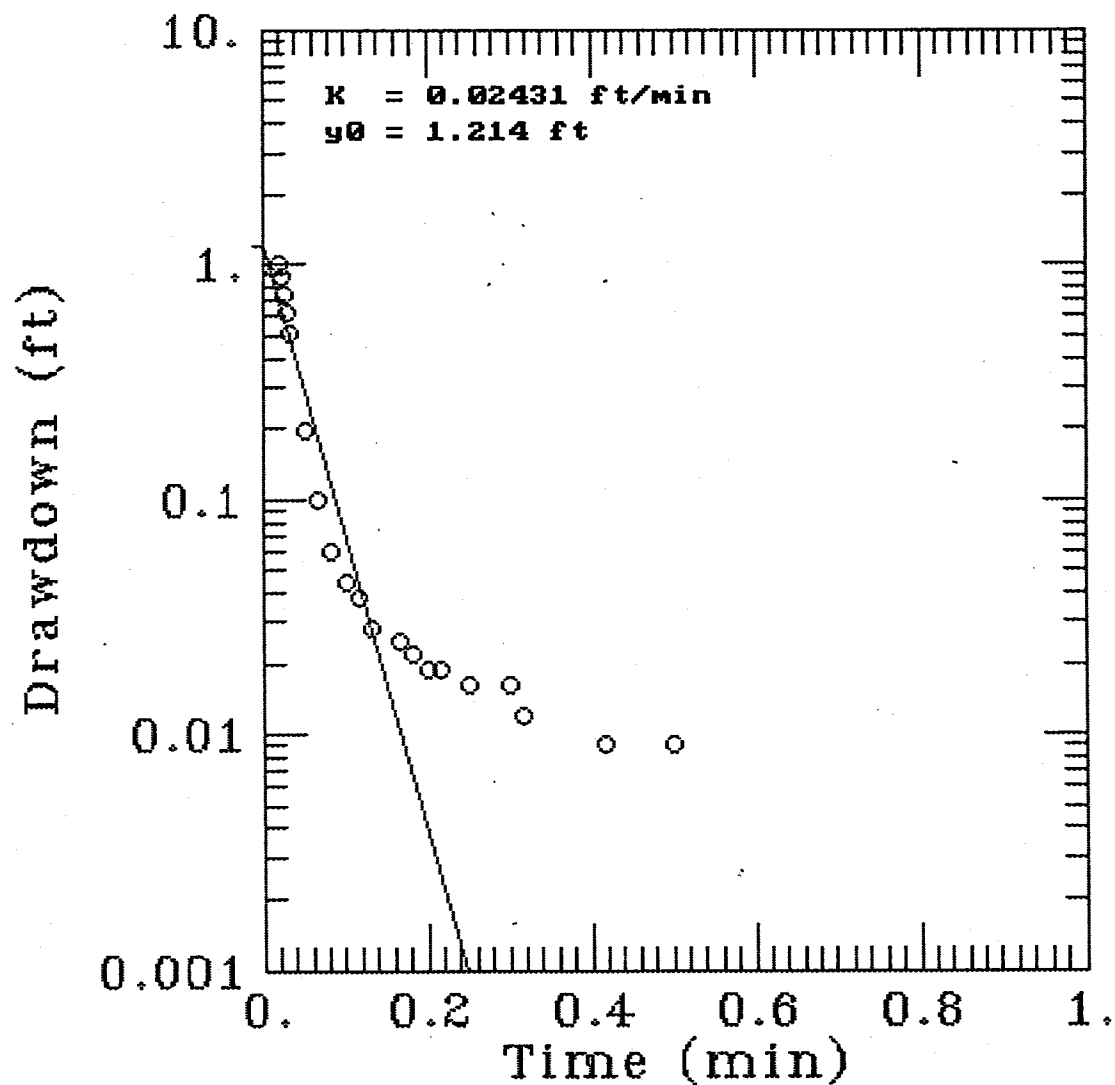
=====

TYPE CURVE DATA

K = 2.50278E-002  
y0 = 1.04076E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
-----	-----	-----	-----	-----	-----
0.000E+000	1.041E+000	1.000E+000	1.394E-013		

# PEN-3810N-MW-4 RUN #3



AQTESOLV



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=====

A Q T E S O L V    R E S U L T S  
Version 1.10

08/10/92

14:16:46

=====

TEST DESCRIPTION

Data set..... A:3810N43.SET  
Data set title..... PEN-3810N-MW-4 RUN #3

Knowns and Constants:

No. of data points..... 20  
Radius of well casing..... 0.083  
Radius of well..... 0.334  
Aquifer saturated thickness..... 8.31  
Well screen length..... 10  
Static height of water in well..... 8.31  
Log(Re/Rw)..... 2.451  
A, B, C..... 0.000, 0.000, 1.967

=====

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

=====

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

Estimate  
K = 8.4604E-003  
y0 = 0.0000E+000

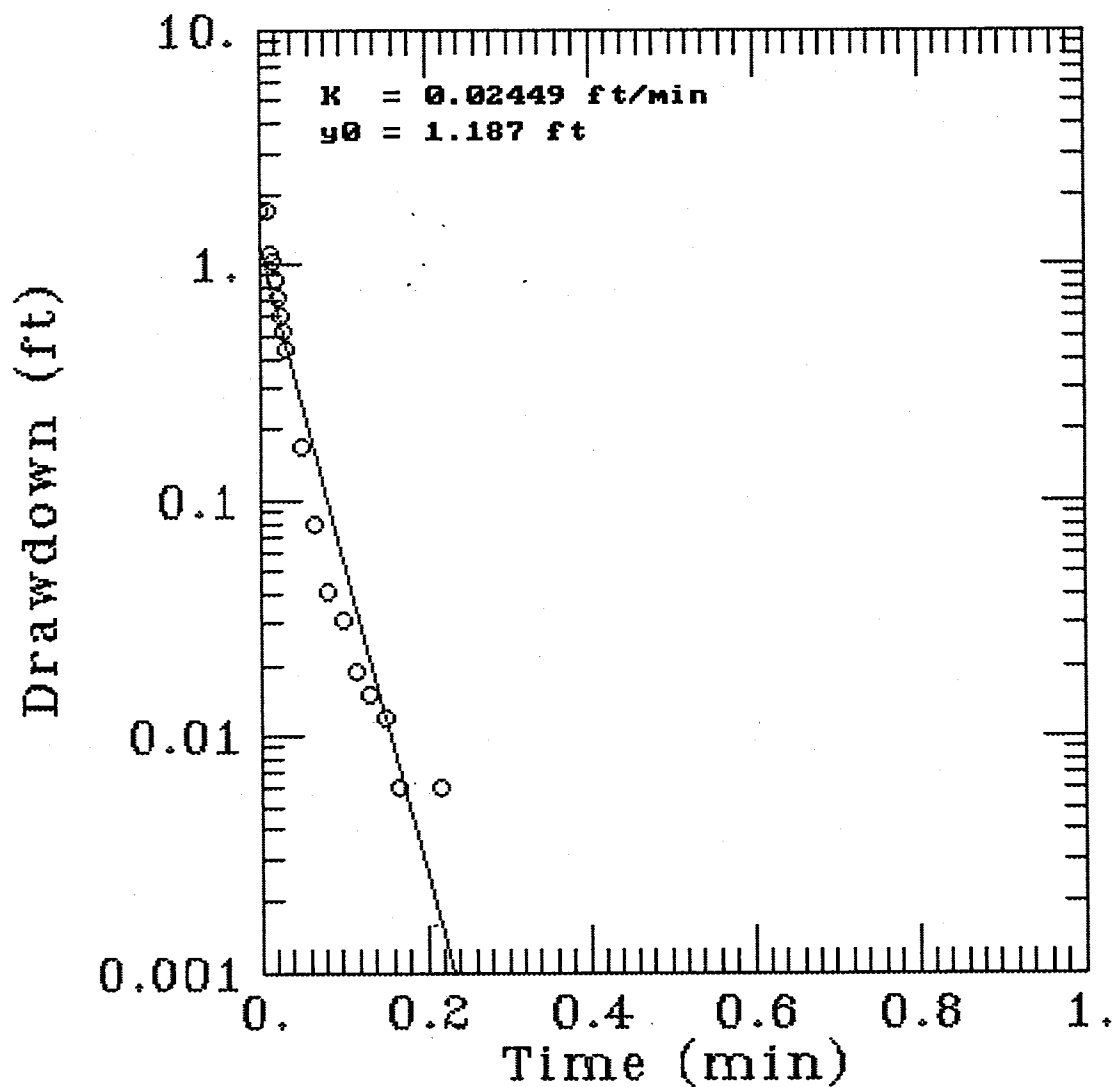
=====

TYPE CURVE DATA

K = 2.43069E-002  
y0 = 1.21444E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
-----	-----	-----	-----	-----	-----
0.000E+000	1.214E+000	1.000E+000	3.821E-013		

# PEN-3810N-MW-6 RUN #1



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A Q T E S O L V    R E S U L T S  
Version 1.10

08/10/92

14:32:10

=====

TEST DESCRIPTION

Data set..... A:3810N61.SET  
Data set title..... PEN-3810N-MW-6 RUN #1

Knowns and Constants:

No. of data points..... 17  
Radius of well casing..... 0.083  
Radius of well..... 0.334  
Aquifer saturated thickness..... 6.8  
Well screen length..... 10  
Static height of water in well..... 6.8  
Log(Re/Rw)..... 2.322  
A, B, C..... 0.000, 0.000, 1.967

=====

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

=====

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

Estimate  
K = 2.4487E-002  
y0 = 0.0000E+000

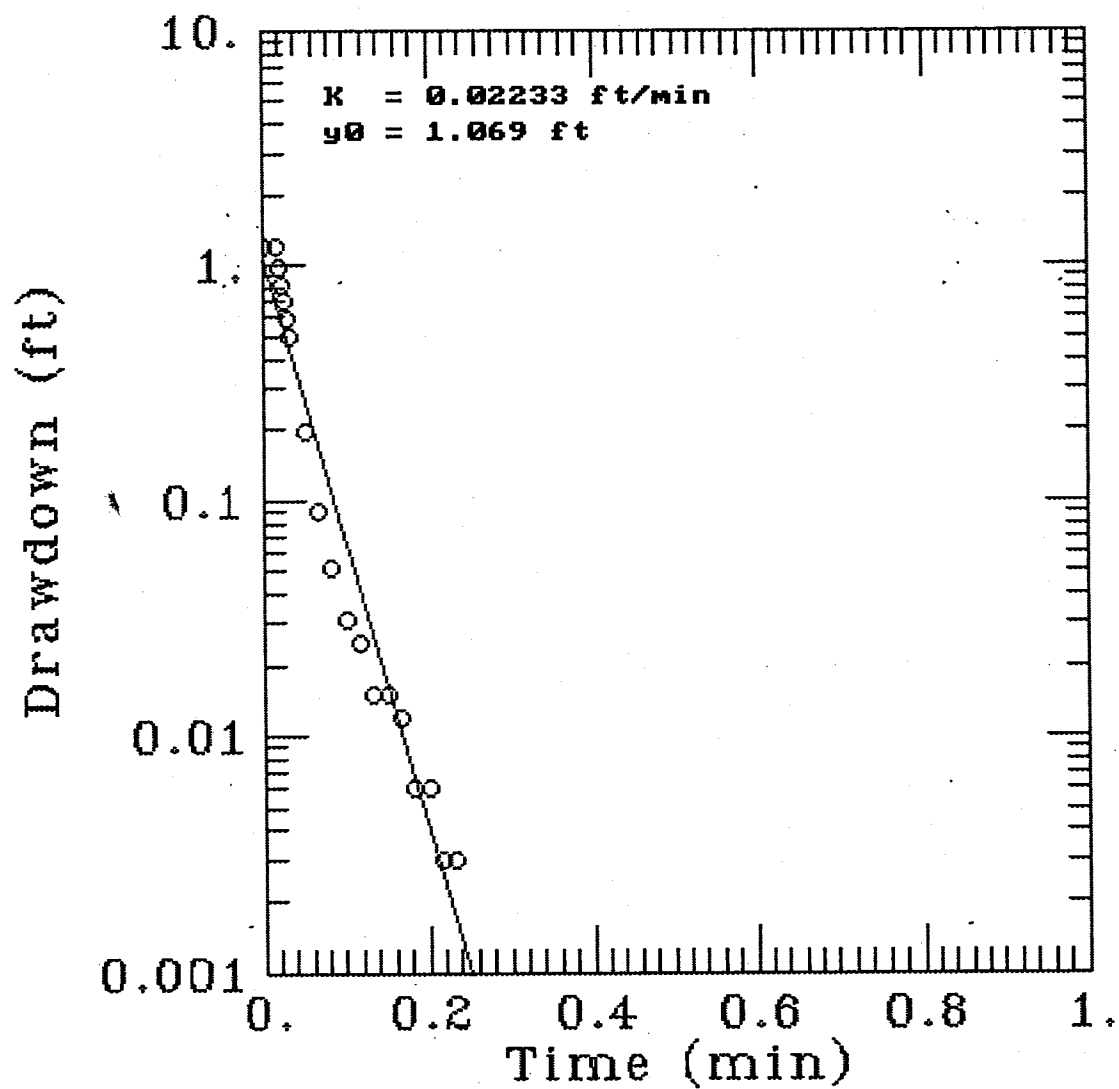
=====

TYPE CURVE DATA

K = 2.44873E-002  
y0 = 1.18721E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
-----	-----	-----	-----	-----	-----
0.000E+000	1.187E+000	1.000E+000	5.975E-014		

# PEN-3810N-MW-6 RUN #2



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A Q T E S O L V   R E S U L T S  
Version 1.10

08/10/92

14:37:07

=====
TEST DESCRIPTION
=====

Data set..... A:3810N62.SET  
Data set title..... PEN-3810N-MW-6 RUN #2

Knowns and Constants:

No. of data points..... 18  
Radius of well casing..... 0.083  
Radius of well..... 0.334  
Aquifer saturated thickness..... 6.8  
Well screen length..... 10  
Static height of water in well..... 6.8  
Log (Re/Rw)..... 2.322  
A, B, C..... 0.000, 0.000, 1.967

=====
ANALYTICAL METHOD
=====

Bouwer-Rice (Unconfined Aquifer Slug Test)

=====
RESULTS FROM VISUAL CURVE MATCHING
=====

VISUAL MATCH PARAMETER ESTIMATES

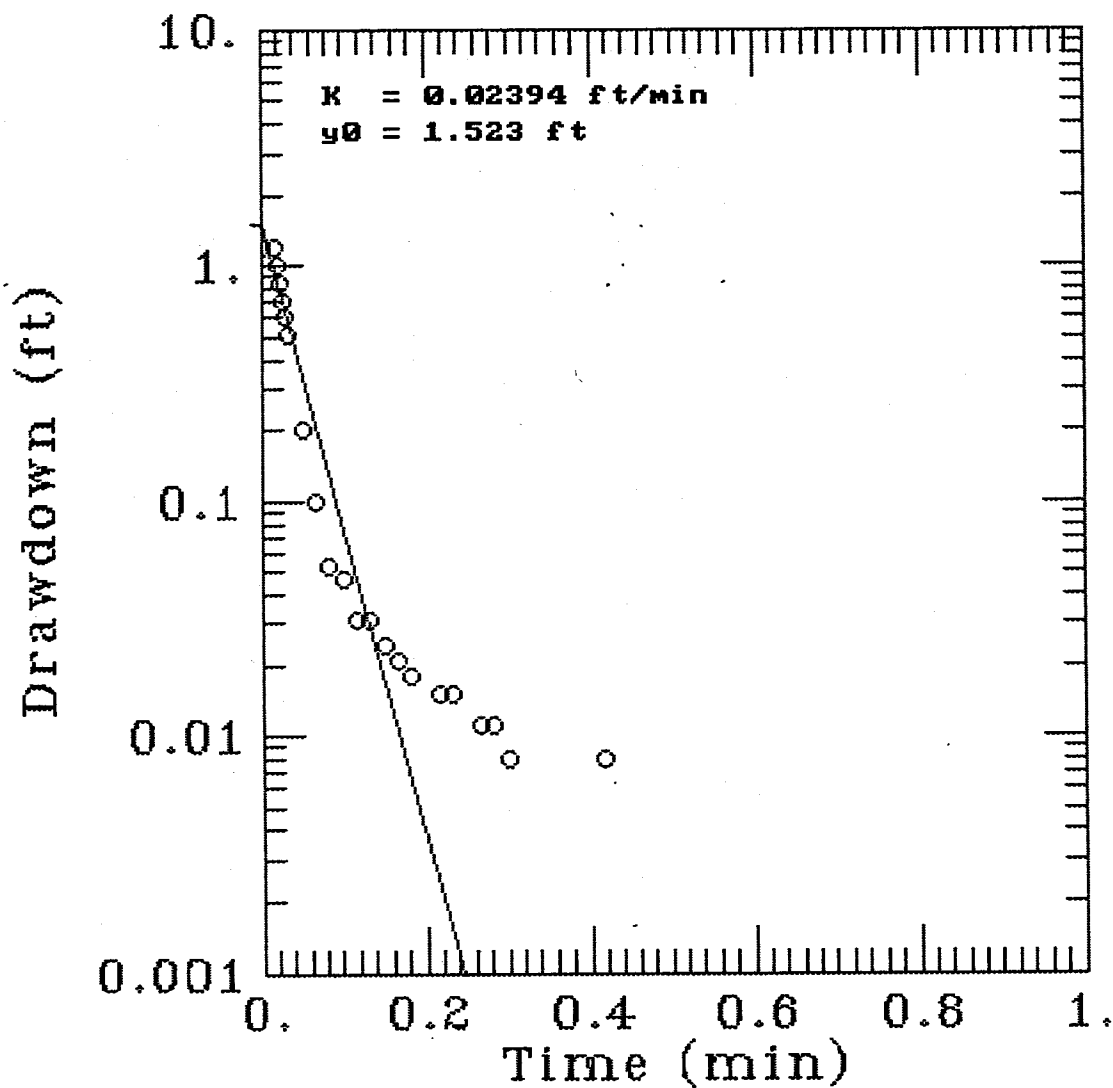
Estimate  
K = 2.2334E-002  
y0 = 0.0000E+000

TYPE CURVE DATA

K = 2.23342E-002  
y0 = 1.06853E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.069E+000	1.000E+000	7.941E-013		

# PEN-3810N-MW-6 RUN #3



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A Q T E S O L V   R E S U L T S  
Version 1.10

08/10/92

14:43:27

=====
TEST DESCRIPTION
=====

Data set.....
Data set title..... PEN-3810N-MW-6 RUN #3

Knowns and Constants:

No. of data points..... 21
Radius of well casing..... 0.083
Radius of well..... 0.334
Aquifer saturated thickness..... 6.8
Well screen length..... 10
Static height of water in well..... 6.8
Log(Re/Rw)..... 2.322
A, B, C..... 0.000, 0.000, 1.967

=====
ANALYTICAL METHOD
=====

Bouwer-Rice (Unconfined Aquifer Slug Test)

=====
RESULTS FROM VISUAL CURVE MATCHING
=====

VISUAL MATCH PARAMETER ESTIMATES

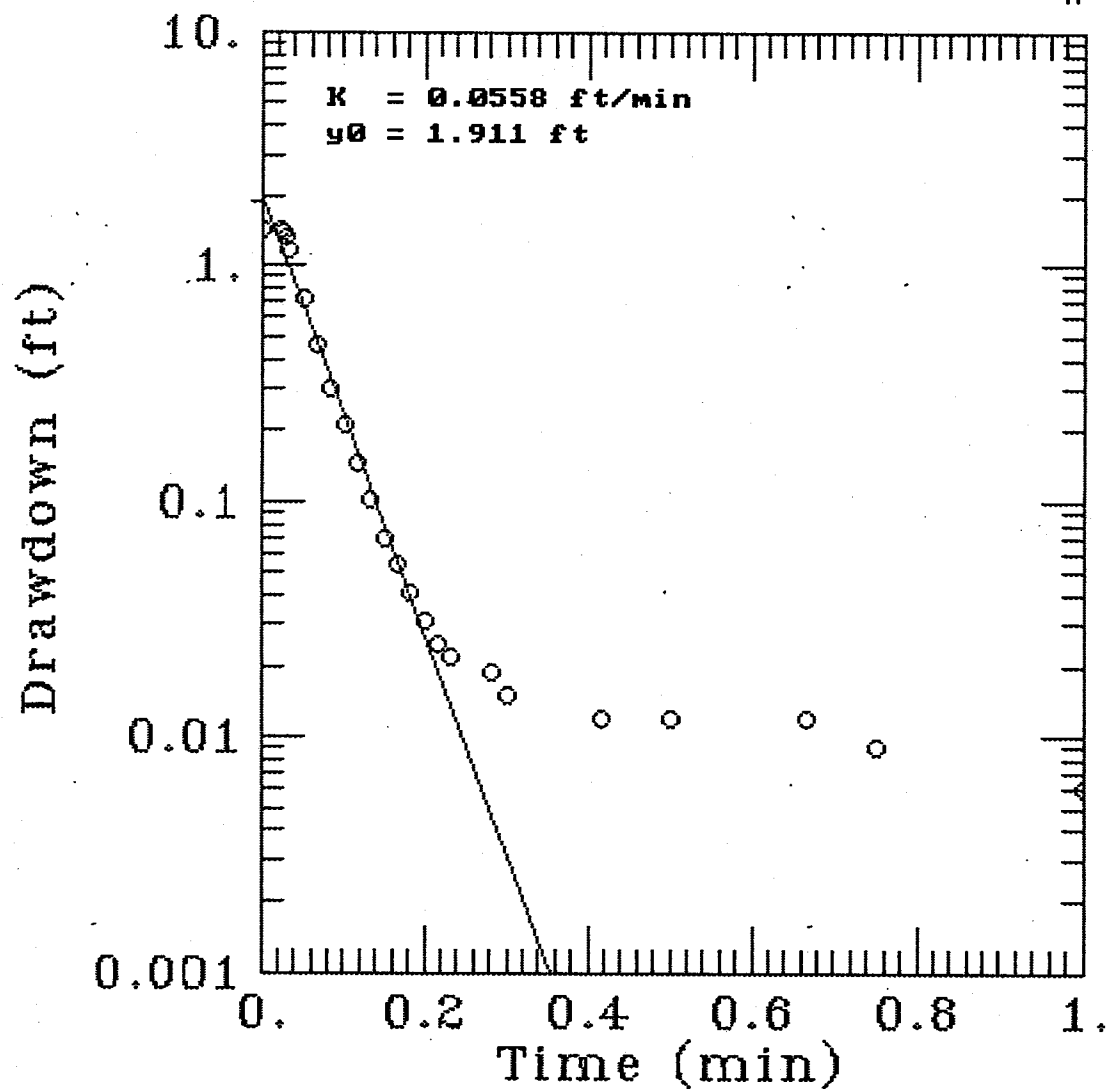
Estimate
K = 1.1146E-002
y0 = 0.0000E+000

TYPE CURVE DATA

K = 2.39425E-002
y0 = 1.52339E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.523E+000	1.000E+000	1.515E-013		

# PEN-3810N-MW-10D RUN #1



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A Q T E S O L V    R E S U L T S  
Version 1.10

08/10/92

13:47:14

=====
TEST DESCRIPTION
=====

Data set..... A:3810ND1.SET  
Data set title..... PEN-3810N-MW-10D RUN #1

Knowns and Constants:

No. of data points..... 23  
Radius of well casing..... 0.083  
Radius of well..... 0.083  
Aquifer saturated thickness..... 13.64  
Well screen length..... 5  
Static height of water in well..... 13.64  
Log (Re/Rw)..... 3.768  
A, B, C..... 0.000, 0.000, 2.998

=====
ANALYTICAL METHOD
=====

Bouwer-Rice (Unconfined Aquifer Slug Test)

=====
RESULTS FROM VISUAL CURVE MATCHING
=====

VISUAL MATCH PARAMETER ESTIMATES

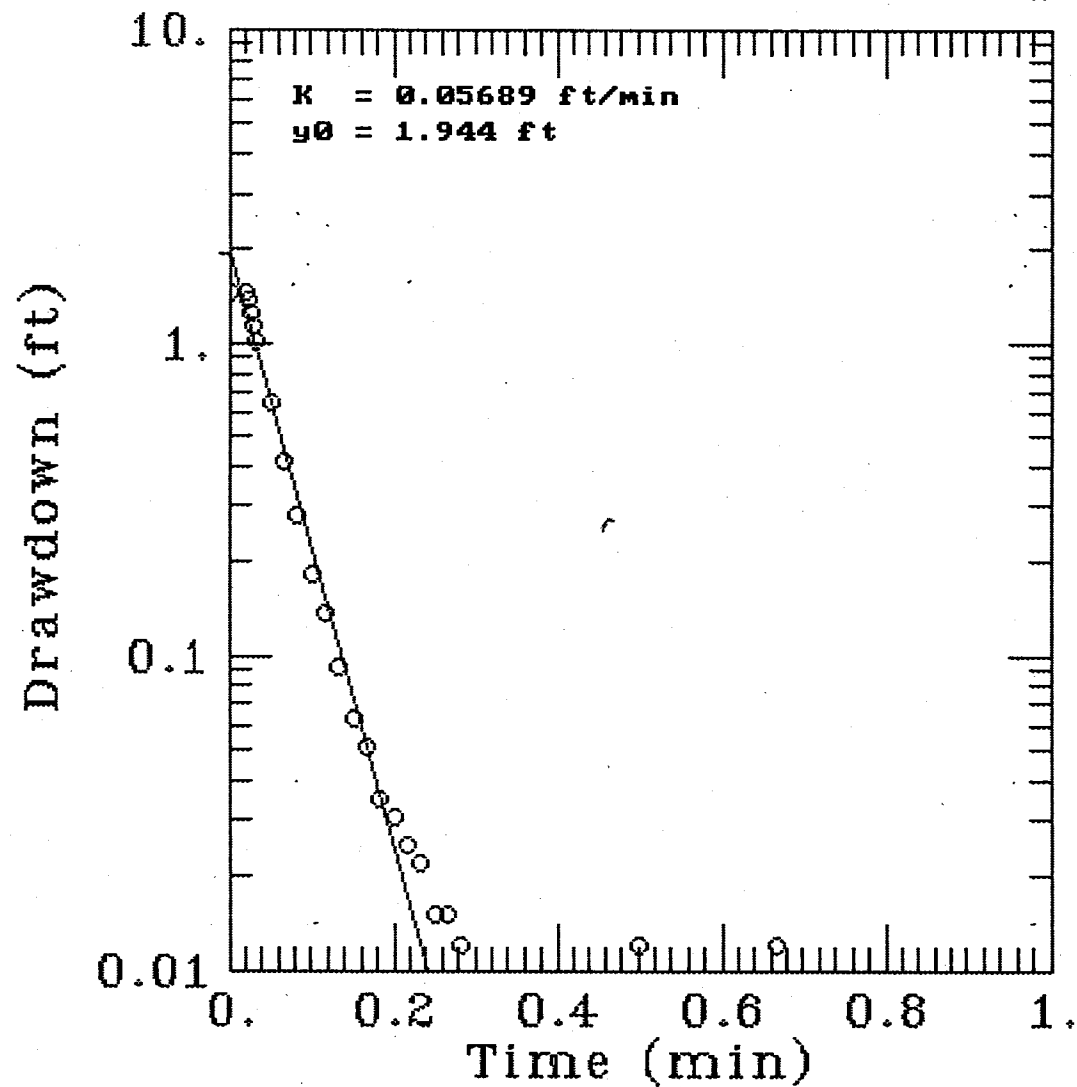
Estimate  
K = 1.4748E-002  
y0 = 0.0000E+000

TYPE CURVE DATA

K = 5.58006E-002  
y0 = 1.91095E+000

Time Drawdown Time Drawdown Time Drawdown  
-----  
0.000E+000 1.911E+000 1.000E+000 8.836E-010

# PEN-3810N-MW-10D RUN #2



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A Q T E S O L V    R E S U L T S  
Version 1.10

08/10/92

13:53:29

=====
TEST DESCRIPTION
=====

Data set..... A:3810ND2.SET  
Data set title..... PEN-3810N-MW-10D RUN #2

Knowns and Constants:

No. of data points..... 22  
Radius of well casing..... 0.083  
Radius of well..... 0.083  
Aquifer saturated thickness..... 13.64  
Well screen length..... 5  
Static height of water in well..... 13.64  
Log(Re/Rw)..... 3.768  
A, B, C..... 0.000, 0.000, 2.998

=====
ANALYTICAL METHOD
=====

Bouwer-Rice (Unconfined Aquifer Slug Test)

=====
RESULTS FROM VISUAL CURVE MATCHING
=====

VISUAL MATCH PARAMETER ESTIMATES

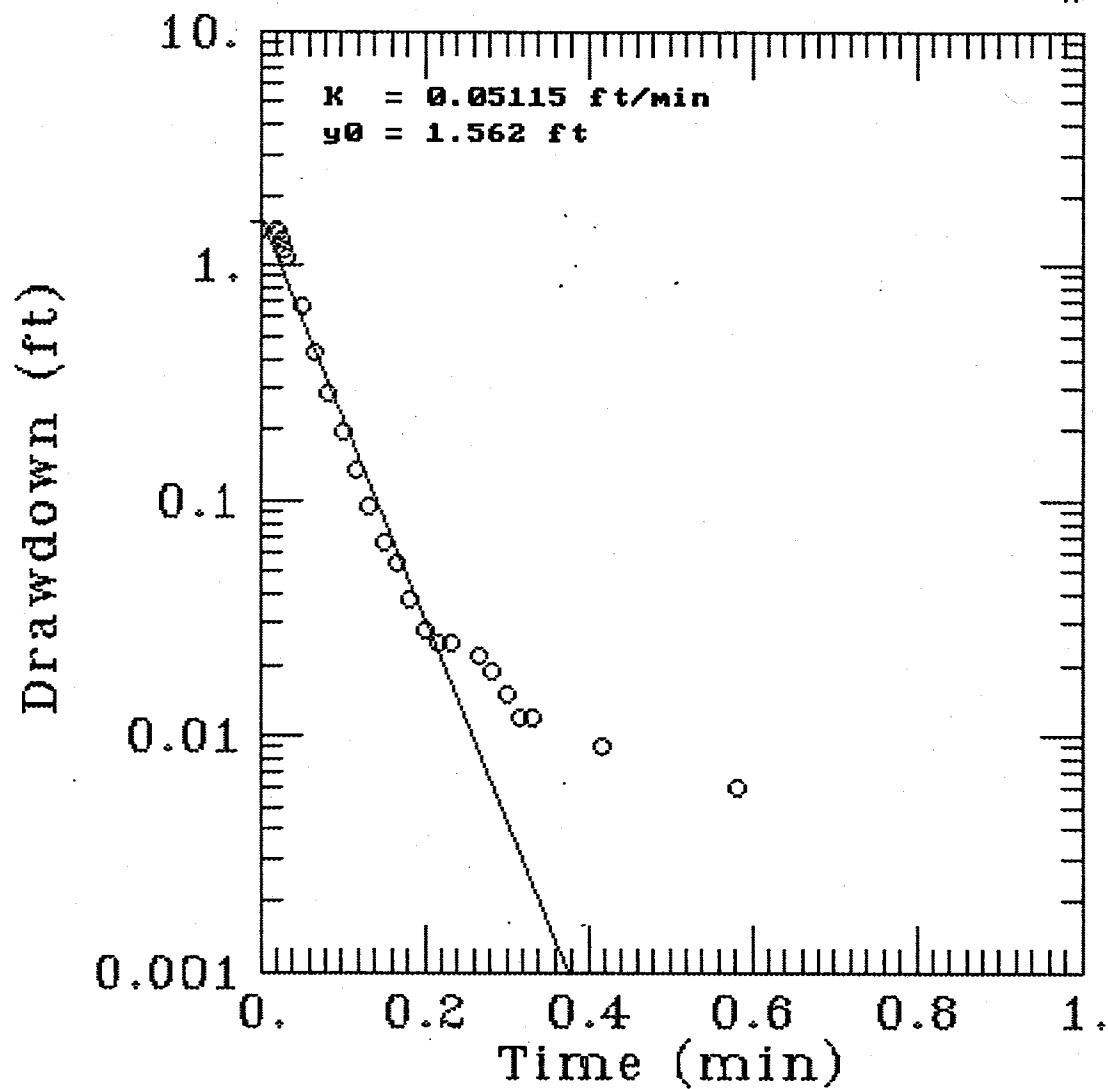
Estimate  
K = 2.3481E-002  
y0 = 0.0000E+000

TYPE CURVE DATA

K = 5.68905E-002  
y0 = 1.94389E+000

Time Drawdown Time Drawdown Time Drawdown  
-----  
0.000E+000 1.944E+000 1.000E+000 5.907E-010

# PEN-3810N-MW-10D RUN #3



AQTESOLV



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& MILLER, INC.



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=====

A Q T E S O L V    R E S U L T S  
Version 1.10

08/10/92

13:59:12

=====

TEST DESCRIPTION

Data set.....

Data set title..... PEN-3810N-MW-10D RUN #3

Knowns and Constants:

No. of data points..... 24  
Radius of well casing..... 0.083  
Radius of well..... 0.083  
Aquifer saturated thickness..... 13.64  
Well screen length..... 5  
Static height of water in well..... 13.64  
Log (Re/Rw)..... 3.768  
A, B, C..... 0.000, 0.000, 2.998

=====

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

=====

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

Estimate  
K = 3.0574E-002  
y0 = 0.0000E+000

=====

TYPE CURVE DATA

K = 5.11506E-002  
y0 = 1.56225E+000

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.562E+000	1.000E+000	4.332E-009		

**APPENDIX E**  
**LABORATORY ANALYTICAL DATA**

**GROUNDWATER SAMPLE ANALYSES**

**February 5, 1992**

**GROUNDWATER SAMPLE ANALYSES**

**April 23, 1992**



WADSWORTH/ALERT

LABORATORIES 5910 Breckenridge Pkwy., Suite H, Tampa, FL 33610

Sampling, testing, mobile labs

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ANALYTICAL REPORT

SUBCONTRACT NUMBER: 1-08-134

TASK ORDER NUMBER: 0015

NAS/NADEP PENSACOLA - PHASE I

Presented to:

ROGER DURHAM

ABB ENVIRONMENTAL SERVICES, INC.

WADSWORTH/ALERT LABORATORIES

5910 BRECKENRIDGE PARKWAY, SUITE H

TAMPA, FL 33610

(813) 621-0784

Dan Henson

Project Manager

Randall C. Grubbs

Laboratory Director - Florida

February 20, 1992



HEADQUARTERS AND  
LABORATORY  
P.O. Box 2912  
4101 Shuffel Drive, N.W.  
North Canton, OH 44720  
(216) 497-9396

REGIONAL  
LABORATORY  
P.O. Box 31454  
5405 Schaaf Rd.  
Cleveland, OH 44131  
(216) 642-9151

REGIONAL  
OFFICE  
1445 Pisgah Church Rd.  
Lexington, SC 29072  
(803) 957-8590

REGIONAL  
LABORATORY  
5910 Breckenridge Pkwy  
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Suite H

5910 Breckenridge Parkway

Tampa, FL 33610

(813) 621-0784

Remit To:

P.O. Box 901103-T

Cleveland, OH 44190

**INVOICE**

Invoice To:

ABB Environmental Services, Inc.  
2590 Executive Center Circle East  
Tallahassee, FL 32301

Report To:

ABB Environmental Services, Inc.  
2590 Executive Center Circle East  
Tallahassee, FL 32301

Attention: Ms. Laurie Huffman

Reference: Subcontract No. 1-08-134, Task Order No. 0015

P.O. NUMBER:

PERIOD COVERED: 02/05/92

SAMPLING SITE: NAS/NADEP PENSACOLA - PHASE I

REPORT RECIPIENT: ROGER DURHAM

REPORT DATE: 02/20/92

INVOICE DATE: 02/20/92

INVOICE NUMBER: B3810

INVOICE ID: 26323

Fed. Id. No.: 06-1112002

QUANT	ANALYSIS	UNIT COST	AMOUNT
12	Kerosene Groups	365.00	4,388.00
1	Trip Blank (601/602)	140.00	140.00
			<hr/>
		SUB-TOTAL	4,528.00
			<hr/>
		TOTAL	4,528.00

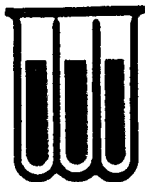
**TERMS: NET 30 DAYS**

Please reference invoice number when remitting.

NOTE:

Applicable samples will be stored at no extra charge for a period of 30 days following the final report. Samples will be properly disposed of after 30 days, unless notified otherwise in writing.

ERB



**WADSWORTH/ALERT  
LABORATORIES, INC.**

5910 Breckenridge Pkwy, Suite H, Tampa, FL 33610

Sampling, testing, mobile labs

Since 1938

February 21, 1992

Mr. Roger Durham  
ABB Environmental Services, Inc.  
2590 Executive Center Circle East  
Tallahassee, FL 32301

Dear Mr. Durham,

Over the course of the past month, it was noted that toluene has begun randomly appearing in samples, trip blanks and equipment blanks at levels ranging from about 2 ug/L to about 22 ug/L. We have investigated its presence and feel that we have located the source of this random contamination problem.

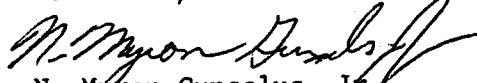
WAL began using custom printed sample container labels this past fall. At that time we evaluated the labels for any trace contaminants and found none. In late December we received a second shipment of identical labels and began using them for sampling kits sent out after 20 December 1991. The investigation of the toluene contamination led us to evaluate this second shipment of labels as well. Upon evaluation, it was found that these labels are contaminated with Toluene as well as 2-Butanone (MEK). Given that these are volatile compounds it can be demonstrated that, under certain conditions, these compounds might migrate across the septum of the sample vial.

We have discontinued use of these labels and are attempting to reissue new labels and bottles for any sample kits which are still pending. In addition we are working with the printer to determine why these labels were not made to our previously determined specifications. We have also established a policy of testing all label batches before they may be used in any kits.

The impact which these findings have on any recent or current analytical data must be determined on an individual basis. If you have any questions regarding this matter or would like to further investigate particular results, please contact your project manager or myself at (813) 621-0784. Thank you for your patience and help in this matter.

Sincerely,

Wadsworth/ALERT Laboratories

  
N. Myron Gunsalus, Jr.  
Quality Control Coordinator

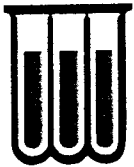


HEADQUARTERS AND  
LABORATORY  
P.O. Box 2912  
4101 Shuffel Drive, N.W.  
North Canton, OH 44720  
(216) 497-9396

REGIONAL  
LABORATORY  
P.O. Box 31454  
5405 Schaaf Rd.  
Cleveland, OH 44131  
(216) 642-9151

REGIONAL  
OFFICE  
1445 Pisgah Church Rd.  
Lexington, SC 29072  
(803) 957-8590

REGIONAL  
LABORATORY  
5910 Breckenridge Pkwy  
Suite H  
Tampa, FL 33610  
(813) 621-0784



WADSWORTH/ALERT  
LABORATORIES

#### INVOLVEMENT

This report summarizes the analytical results of the NAS/NADEP Pensacola - Phase I site submitted by ABB Environmental Services, Inc. to Wadsworth/ALERT Laboratories who provided independent, analytical services for this project under the direction of Roger Durham. The samples were accepted into Wadsworth's Florida facility on 06 February 1992, in accordance with documented sample acceptance procedures. The associated analytical methods and sample results are outlined sequentially in this report.

Analytical results included in this report have been reviewed for compliance with the Laboratory QA/QC Plan as summarized in the Quality Control Section at the rear of the report. Sample custody documentation describing the number of samples and sample matrices is also included. Any qualifications and/or non-compliant items have been noted below.





WADSWORTH/ALERT  
LABORATORIES

### ANALYTICAL METHODS

Wadsworth/ALERT Laboratories utilizes only USEPA approved analytical methods and instrumentation. The analytical methods utilized for the analysis of these samples are listed below.

PARAMETER	METHOD
-----	
ORGANICS	
Volatile Organics	** EPA Method 601/2
Ethylene Dibromide	** EPA Method 601 Mod.
Polynuclear Aromatic Hydrocarbons	** EPA Method 625
METALS	
Lead	** EPA Method 239.2
MISCELLANEOUS	
Tot. Rec. Petroleum Hydrocarbons	** EPA Method 418.1

NOTE: \*\* Indicates usage of this method to obtain results for this report.

EPA Methods -Methods for Chemical Analysis of Water and Wastes, USEPA, 600/4-79-020, March, 1983. July, 1982  
Drinking Waters USEPA, 600/4-88/039, December, 1988.

Std. Methods -Standard Methods for the Examination of Water and Wastewater, APHA, 16th edition, 1985.

USEPA Methods -From 40CFR Part 136, published in Federal Register on October 26, 1984.

SW846 Methods -Test Methods for Evaluating Solid Waste Physical/Chemical Methods, 3rd Edition, USEPA, 1986.

ASTM Methods -American Society for Testing and Materials.

NIOSH Method -NIOSH Manual of Analytical Methods, National Institute for Occupational Safety and Health, 2nd Edition, April 1977.



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-1  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/14/92

SAMPLE ID: MW 1      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	30
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	84	(78-122)
Trifluorotoluene (PID)	108	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-1  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW 1      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-1  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/12/92  
DATE ANALYZED: 2/15/92

SAMPLE ID: MW 1 NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
POLYNUCLEAR AROMATIC HYDROCARBONS HRS84297  
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	50	(22-135)	(10-155)
Fluorobiphenyl	55	(34-140)	(12-153)
Terphenyl-d14	30	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-1  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : MW 1      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	2/15- 2/17/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2B0601-1  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/14/92  
DATE ANALYZED: 2/14/92

SAMPLE ID: MW 1      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	5	mg/L	1

**NOTE:** ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-2  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW 2      NADEP PENSACOLA/3810N

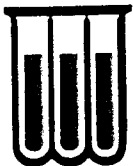
CERTIFICATION #: E84059  
HRS84297

**VOLATILE ORGANICS**  
**METHOD 601/602 - GC**

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	16
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	39
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

<b>SURROGATE RECOVERY:</b>	<b>%</b>	<b>ACCEPTABLE LIMITS</b>
Bromochloromethane (HECD)	82	(78-122)
Trifluorotoluene (PID)	123	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-2  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW 2      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-2  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/12/92  
DATE ANALYZED: 2/15/92

SAMPLE ID: MW 2      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

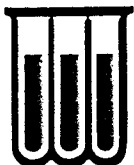
POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	13
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	88
2-Methylnaphthalene	76
Naphthalene	45
Phenanthrene	14
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5  
ND\* (None Detected, lower detectable limit =  
-- (Not Analyzed)

ug/L) as rec'd  
ug/L) as rec'd

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	50	(22-135)	(10-155)
Fluorobiphenyl	48	(34-140)	(12-153)
Terphenyl-d14	30	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-2  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : MW 2      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	2/15- 2/17/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2B0601-2  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/14/92  
DATE ANALYZED: 2/14/92

SAMPLE ID: MW 2      NADEP PENSACOLA/3810N

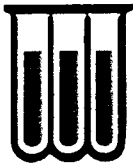
CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	54	mg/L	10

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-3  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW 3      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	107	(78-122)
Trifluorotoluene (PID)	101	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-3  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW 3      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT**

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-3  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/12/92  
DATE ANALYZED: 2/15/92

SAMPLE ID: MW 3      NADEP PENSACOLA/3810N

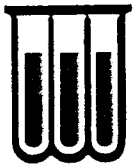
CERTIFICATION #: E84059  
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	49	(22-135)	(10-155)
Fluorobiphenyl	57	(34-140)	(12-153)
Terphenyl-d14	28	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-3  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : MW 3      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	2/15- 2/17/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2B0601-3  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/14/92  
DATE ANALYZED: 2/14/92

SAMPLE ID: MW 3      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-4  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW 4      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	99	(78-122)
Trifluorotoluene (PID)	101	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-4  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW 4      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT**

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-4  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/12/92  
DATE ANALYZED: 2/15/92

SAMPLE ID: MW 4      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

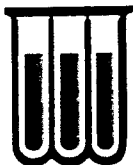
POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5  
ND\* (None Detected, lower detectable limit =  
-- (Not Analyzed)

ug/L) as rec'd  
ug/L) as rec'd

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	48	(22-135)	(10-155)
Fluorobiphenyl	57	(34-140)	(12-153)
Terphenyl-d14	27	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-4  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : MW 4      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	2/15- 2/17/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2B0601-4  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/14/92  
DATE ANALYZED: 2/14/92

SAMPLE ID: MW 4 NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

**NOTE:** ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-5  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW 5      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**VOLATILE ORGANICS**  
**METHOD 601/602 - GC**

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

<b>SURROGATE RECOVERY:</b>	<b>%</b>	<b>ACCEPTABLE LIMITS</b>
Bromochloromethane (HECD)	107	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-5  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW 5      NADEP PENSACOLA/3810N

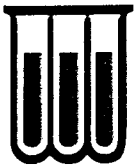
CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-5  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/12/92  
DATE ANALYZED: 2/15/92

SAMPLE ID: MW 5      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
POLYNUCLEAR AROMATIC HYDROCARBONS      HRS84297  
METHOD 625 HSL/TCL LIST - GC/MS

---

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	54	(22-135)	(10-155)
Fluorobiphenyl	63	(34-140)	(12-153)
Terphenyl-d14	36	(10-132)	(13-140)





WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-5  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : MW 5      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	2/15- 2/17/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2B0601-5  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/14/92  
DATE ANALYZED: 2/14/92

SAMPLE ID: MW 5      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	1	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-6  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW 6      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	103	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-6  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/90

SAMPLE ID: MW 6      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-6  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/12/92  
DATE ANALYZED: 2/15/92

SAMPLE ID: MW 6      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

---

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	50	(22-135)	(10-155)
Fluorobiphenyl	55	(34-140)	(12-153)
Terphenyl-d14	33	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-6  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : MW 6      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

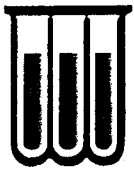
**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	2/15- 2/17/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2B0601-6  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/14/92  
DATE ANALYZED: 2/14/92

SAMPLE ID: MW 6      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-7  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW 7      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	112	(78-122)
Trifluorotoluene (PID)	98	(73-131)





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-7  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW 7      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-7  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/12/92  
DATE ANALYZED: 2/15/92

SAMPLE ID: MW 7      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	44	(22-135)	(10-155)
Fluorobiphenyl	51	(34-140)	(12-153)
Terphenyl-d14	33	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-7  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : MW 7      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	2/15- 2/17/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2B0601-7  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/14/92  
DATE ANALYZED: 2/14/92

SAMPLE ID: MW 7 NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

**NOTE:** ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-8  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/18/92

SAMPLE ID: MW 8      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:  
Bromochloromethane (HECD)  
Trifluorotoluene (PID)

%  
105  
104

ACCEPTABLE LIMITS  
(78-122)  
(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-8  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW 8      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-8  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/12/92  
DATE ANALYZED: 2/15/92

SAMPLE ID: MW 8      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	46	(22-135)	(10-155)
Fluorobiphenyl	55	(34-140)	(12-153)
Terphenyl-d14	31	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-8  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : MW 8 . NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	2/15- 2/17/92	ND	5 ug/L

NOTE: ND (None Detected)





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2B0601-8  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/14/92  
DATE ANALYZED: 2/14/92

SAMPLE ID: MW 8      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	<b>RESULT</b>	<b>UNITS</b>	<b>LOWER DETECTION LIMIT</b>
Total Recoverable Petroleum Hydrocarbons	2	mg/L	1

**NOTE:** ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-9  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/15/92

SAMPLE ID: MW 9      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	87	(78-122)
Trifluorotoluene (PID)	105	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-9  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW 9      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT**

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-9  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/12/92  
DATE ANALYZED: 2/15/92

SAMPLE ID: MW 9      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	54	(22-135)	(10-155)
Fluorobiphenyl	58	(34-140)	(12-153)
Terphenyl-d14	31	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-9  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : MW 9      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	2/15- 2/17/92	ND	5	ug/L

**NOTE:** ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2B0601-9  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/14/92  
DATE ANALYZED: 2/14/92

SAMPLE ID: MW 9      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	2	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-10  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/19/92

SAMPLE ID: MW 10D      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

---

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	2 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	5
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	99	(78-122)
Trifluorotoluene (PID)	109	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-10  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW 10D NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-10  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/12/92  
DATE ANALYZED: 2/15/92

SAMPLE ID: MW 10D NADEP PENSACOLA/3810N

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	30
2-Methylnaphthalene	31
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 6  
ND\* (None Detected, lower detectable limit =  
-- (Not Analyzed)

ug/L) as rec'd  
ug/L) as rec'd

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	55	(22-135)	(10-155)
Fluorobiphenyl	65	(34-140)	(12-153)
Terphenyl-d14	39	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-10  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : MW 10D NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

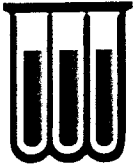
**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	2/15- 2/17/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2B0601-10  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/14/92  
DATE ANALYZED: 2/14/92

SAMPLE ID: MW 10D NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	1	mg/L	1

**NOTE:** ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-11  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/18/92

SAMPLE ID: DUPLICATE      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	109	(78-122)
Trifluorotoluene (PID)	105	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-11  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: DUPLICATE NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-11  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/12/92  
DATE ANALYZED: 2/17/92

SAMPLE ID: DUPLICATE      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
POLYNUCLEAR AROMATIC HYDROCARBONS      HRS84297  
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5  
ND\* (None Detected, lower detectable limit =  
-- (Not Analyzed)

ug/L) as rec'd  
ug/L) as rec'd

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	53	(22-135)	(10-155)
Fluorobiphenyl	59	(34-140)	(12-153)
Terphenyl-d14	39	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-11  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : DUPLICATE      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	2/15- 2/17/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2B0601-11  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/14/92  
DATE ANALYZED: 2/14/92

SAMPLE ID: DUPLICATE      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

**NOTE:** ND (None Detected)





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-12  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: EQUIPMENT BLANK NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	102	(78-122)
Trifluorotoluene (PID)	105	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-12  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: EQUIPMENT BLANK NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-12  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/12/92  
DATE ANALYZED: 2/17/92

SAMPLE ID: EQUIPMENT BLANK      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	41	(22-135)	(10-155)
Fluorobiphenyl	57	(34-140)	(12-153)
Terphenyl-d14	64	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-12  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : EQUIPMENT BLANK      NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	2/15- 2/17/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2B0601-12  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/14/92  
DATE ANALYZED: 2/14/92

SAMPLE ID: EQUIPMENT BLANK NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

**NOTE:** ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-13  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: TRIP BLANK

NADEP PENSACOLA/3810N

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	30
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	90	(78-122)
Trifluorotoluene (PID)	108	(73-131)



WADSWORTH/ALERT  
LABORATORIES

## QUALITY CONTROL SECTION

- Quality Control Summary
- Laboratory Blanks
- Laboratory Control Sample
- Matrix Spike/Matrix Spike Duplicate Results
- Sample Custody Documentation



WADSWORTH/ALERT  
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL  
PROGRAM SUMMARY

Wadsworth/ALERT Laboratories considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with various analytical result reports. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow.

Surrogate Spike Recovery Evaluations

Known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added, as appropriate, to routine GC and GC/MS sample fractions prior to extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is an indication of the overall method efficiency for the individual sample. This surrogate spike recovery data is displayed alongside acceptable analytical method performance limits at the bottom of each applicable analytical result report sheet.

NOTE: Acceptable method performance for Base/Neutral Acid extractables is indicated by two (2) of three (3) surrogates for each fraction with a minimum recovery of ten (10) percent each. For Pesticides one (1) of two (2) surrogates meeting performance criteria is acceptable.

Laboratory Analytical Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interferences and background contamination levels associated with each analytical method. These method blanks include all aspects of actual laboratory method analysis (chemical reagents, glassware, etc.), substituting laboratory reagent water or solid for actual sample. The method blank must not contain any analytes above the reported detection limit. The following common laboratory contaminants are exceptions to this rule provided they are not present at greater than five times the detection limit.

Volatiles

Methylene chloride  
Toluene  
2-Butanone  
Acetone

Semi-volatiles

Dimethyl phthalate  
Diethyl phthalate  
Di-n-butyl phthalate  
Butyl benzyl phthalate  
Bis (2-ethylhexyl) phthalate

Metals

Calcium  
Magnesium  
Sodium

A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method blanks.

Laboratory Analytical Method Check Sample Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to a laboratory reagent blank prior to extraction and analysis. Percent recovery determinations demonstrate the performance of the analytical method. Failure of a check sample to meet established laboratory recovery criteria is cause to stop the analysis until the problem is resolved.





WADSWORTH/ALERT  
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL  
PROGRAM SUMMARY  
(cont'd)

At that time all associated samples must be re-analyzed. A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method check samples.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to two of three separate aliquots of a sequentially predetermined sample prior to extraction and analysis. Percent recovery determinations are calculated from both of the spiked samples by comparison to the actual values generated from the unspiked sample. These percent recovery determinations indicate the accuracy of the analysis at recovering actual analytical method compounds from the matrix. Relative percent difference determinations calculated from a comparison of the MS/MSD recoveries demonstrate the precision of the analytical method. Actual percent recovery and relative percent difference data is displayed alongside their respective acceptable analytical method performance limits in the QA/QC section of the report. The MS/MSD are considered in control when the precision is within established control limits and the associated check sample has been found to be acceptable. A minimum of ten percent (10%) of all analyses are MS/MSD quality control samples.

\*\*\*\*\*EXAMPLE\*\*\*\*\*

COMPOUND	SAMPLE CONC.	MS	MSD	RPD	QC LIMITS	
		%REC	%REC		RPD	RECOVERY
4,4'-DDT	0	95	112	16	22	66-119
Benzene	10	86	93	8	20	39-150

(cmpd. name)	sample	1st%	2nd%	Rel.%	accep. method
	result	recov.	recov.	diff.	perform range

Analytical Result Qualifiers

The following qualifiers, as defined below, may be appended to analytical results in order to allow proper interpretation of the results presented:

J - indicates an estimated concentration (typically used when a dilution, matrix interference or instrumental limitation prevents accurate quantitation of a particular analyte).

B - indicates the presence of a particular analyte in the laboratory blank analyzed concurrently with the samples. Results must be interpreted accordingly.

DIL - indicates that because of matrix interferences and/or high analyte concentrations, it was necessary to dilute the sample to a point where the surrogate or spike concentrations fell below a quantifiable amount and could not be reported.



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-BK  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/11/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

---

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	104	(78-122)
Trifluorotoluene (PID)	98	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-BK  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/11/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	101	(78-122)
Trifluorotoluene (PID)	104	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-BK  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	82	(78-122)
Trifluorotoluene (PID)	109	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-BK  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/14/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	75	(78-122)
Trifluorotoluene (PID)	108	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-BK  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/18/92

SAMPLE ID: LABORATORY BLANK

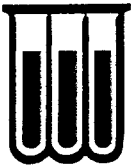
CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	101	(78-122)
Trifluorotoluene (PID)	107	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0601-BK  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/19/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	99	(78-122)
Trifluorotoluene (PID)	107	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-BK  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-BK  
MATRIX: WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/12/92  
DATE ANALYZED: 2/17/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
POLYNUCLEAR AROMATIC HYDROCARBONS HRS84297  
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	65	(22-135)	(10-155)
Fluorobiphenyl	70	(34-140)	(12-153)
Terphenyl-d14	79	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0601-BK  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

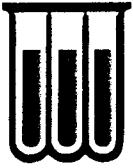
METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	2/15- 2/17/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2B0601-BK  
MATRIX : WATER

DATE RECEIVED: 2/ 6/92  
DATE EXTRACTED: 2/14/92  
DATE ANALYZED: 2/14/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

LAB #: 2B0601-LCS  
MATRIX: WATER  
METHOD: 601/2

DATE RECEIVED: 02/06/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/11/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
1,1-Dichloroethene	120	43-131
Trichloroethene	115	75-123
Chlorobenzene	97	58-133
Toluene	105	70-117
Benzene	105	70-117
Dichlorobromomethane	91	61-133



WADSWORTH/ALERT  
LABORATORIES

LAB #: 2B0601-LCS  
MATRIX: WATER  
METHOD: 601/2

DATE RECEIVED: 02/06/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/11/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
1,1-Dichloroethene	109	43-131
Trichloroethene	104	75-123
Chlorobenzene	101	58-133
Toluene	111	70-117
Benzene	111	70-117
Dichlorobromomethane	92	61-133



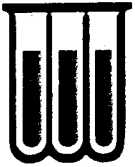
WADSWORTH/ALERT  
LABORATORIES

LAB #: 2B0601-LCS  
MATRIX: WATER  
METHOD: 601/2

DATE RECEIVED: 02/06/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/12/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
1,1-Dichloroethene	100	43-131
Trichloroethene	97	75-123
Chlorobenzene	98	58-133
Toluene	109	70-117
Benzene	109	70-117
Dichlorobromomethane	81	61-133



WADSWORTH/ALERT  
LABORATORIES

LAB #: 2B0601-LCS  
MATRIX: WATER  
METHOD: 601/2

DATE RECEIVED: 02/06/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/14/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
1,1-Dichloroethene	86	43-131
Trichloroethene	92	75-123
Chlorobenzene	118	58-133
Toluene	113	70-117
Benzene	114	70-117
Dichlorobromomethane	70	61-133



WADSWORTH/ALERT  
LABORATORIES

LAB #: 2B0601-LCS  
MATRIX: WATER  
METHOD: 601/2

DATE RECEIVED: 02/06/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/18/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
1,1-Dichloroethene	88	43-131
Trichloroethene	100	75-123
Chlorobenzene	83	58-133
Toluene	93	70-117
Benzene	95	70-117
Dichlorobromomethane	86	61-133





WADSWORTH/ALERT  
LABORATORIES

LAB #: 2B0601-LCS  
MATRIX: WATER  
METHOD: 601/2

DATE RECEIVED: 02/06/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/19/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
1,1-Dichloroethene	70	43-131
Trichloroethene	89	75-123
Chlorobenzene	86	58-133
Toluene	92	70-117
Benzene	90	70-117
Dichlorobromomethane	76	61-133



WADSWORTH/ALERT  
LABORATORIES

LAB #: 2B0601-LCS  
MATRIX: WATER  
METHOD: 601 Mod.

DATE RECEIVED: 02/06/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/12/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
Ethylene Dibromide	104	81-135



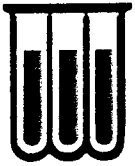
WADSWORTH/ALERT  
LABORATORIES

LAB #: 2B0601-LCS  
MATRIX: WATER  
METHOD: 625

DATE RECEIVED: 02/06/92  
DATE EXTRACTED: 02/12/92  
DATE ANALYZED: 02/15/92

LABORATORY CHECK SAMPLE RECOVERY

COMPOUND	LCS %REC	QC LIMITS RECOVERY
Acenaphthene	65	31-105
Pyrene	74	12-108



WADSWORTH/ALERT  
LABORATORIES

LAB #: 2B0601-LCS  
MATRIX: WATER

DATE RECEIVED: 02/06/92  
DATE PREP'D: 02/15/92  
DATE ANALYZED: 02/17/92

LABORATORY CHECK SAMPLE RECOVERY

COMPOUND	LCS %REC	QC LIMITS RECOVERY
Lead, furnace	93	64-131



WADSWORTH/ALERT  
LABORATORIES

LAB #: 2B0601-LCS  
MATRIX: WATER

DATE RECEIVED: 02/06/92  
DATE EXTRACTED: 02/14/92  
DATE ANALYZED: 02/14/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS RECOVERY
Tot. Rec. Pet. Hydrocarbons	101	75-124



WADSWORTH/ALERT  
LABORATORIES

LAB#: 2B0601-9  
MATRIX: WATER  
METHOD: 601/2

DATE RECEIVED : 02/06/92  
DATE EXTRACTED: NA  
DATE ANALYZED : 02/18/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	MS %REC	MSD %REC	RPD	QC RPD	LIMITS RECOVERY
1,1-Dichloroethene	74	76	3	28	43-131
Trichloroethene	96	97	1	13	75-123
Chlorobenzene	87	89	2	24	58-133
Toluene	96	97	1	16	70-117
Benzene	95	96	1	15	70-117
Dichlorobromomethane	82	84	2	22	61-133



WADSWORTH/ALERT  
LABORATORIES

LAB ID: 2B0601-9  
MATRIX: WATER  
METHOD: 601 Mod.

DATE RECEIVED: 02/06/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/12/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	MS	MSD	RPD	QC LIMITS	
	%REC	%REC		RPD	RECOVERY
Ethylene Dibromide	39	38	3	25	81-135



WADSWORTH/ALERT  
LABORATORIES

LAB#: 2B0601-10  
MATRIX: WATER  
METHOD: 625

DATE RECEIVED: 02/06/92  
DATE EXTRACTED: 02/12/92  
DATE ANALYZED: 02/15/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	MS %REC	MSD %REC	RPD	QC LIMITS RPD	RECOVERY
Acenaphthene	66	65	2	24	57-104
Pyrene	76	74	3	30	58-148





WADSWORTH/ALERT  
LABORATORIES

LAB#: 2B0601-5  
MATRIX: WATER

DATE RECEIVED: 02/06/92  
DATE PREP'D: 02/15/92  
DATE ANALYZED: 02/17/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY  
INORGANIC PARAMETERS - METALS

COMPOUND	MS %REC	MSD %REC	RPD	QC LIMITS RPD	RECOVERY
Lead, furnace	98	92	6	24	76-124

**WADSWORTH/ALERT LABORATORIES  
SAMPLE SHIPPER EVALUATION AND RECEIPT FORM**

Client: 483 Project Name/Number: NADEP PERMCOA/3810 N

Samples Received By: Robert Thompson Date Received: 2/6/92  
(Signature)

Sample Evaluation Form By: Robert Thompson LAB No: 3810/280601-1213  
(Signature)

Type of shipping container samples received in? WAL Cooler ☒

Client Cooler ☐ WAL Shipper ☐ Box ☐ Other ☐

Any "NO" responses or discrepancies should be explained in comments section.

- |  | YES                                 | NO                       |
|--|-------------------------------------|--------------------------|
| 1. Were custody seals on shipping container(s) intact? . . . . .   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Were custody papers properly included with samples? . . . . .   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Were custody papers properly filled out (ink, signed, match labels)? . . . . .  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 4. Did all bottles arrive in good condition (unbroken)? . . . . .  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 5. Were all bottle labels complete (Sample No., date, signed, analysis preservatives)? . . . . .                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 6. Were correct bottles used for the tests indicated? . . . . .  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 7. Were proper sample preservation techniques indicated? . . . . .   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 8. Were samples received within adequate holding time? . . . . .   | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 9. Were all VOA bottles checked for the presence of air bubbles? (If air bubbles were found indicate in comment section) . . . . . | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 10. Were samples in direct contact with wet ice? (NOTE TEMPERATURE BELOW) . . . . .  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 11. Were samples accepted into the laboratory? (If no see comments) . . . . .  | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Cooler # N/A Temp 2 °C Cooler #        Temp        °C

Cooler # 164 Temp 3 °C Cooler #        Temp        °C

Comments: MW-10 BUBBLES IN BOTH VIALS (601/602) SOME ~~HA~~ LABLED MW-10 G.M.W.-TD  
MW-10 BUBBLES IN BOTH VIALS (EDB + 601/602) SAME SAMPLING DATE

Rec'd Trip Blank not listed on COC

ARB

20601-1516

## WADSWORTH/ALERT LABORATORIES – FLORIDA

5910-H BRECKENRIDGE PARKWAY/TAMPA, FL 33610

(813) 621-0784

Chain-of Custody Record

No 5170

PROJ. NO.		PROJECT NAME/LOCATION				NO. OF CON- TAINERS	PARAMETER						REMARKS
SAMPLERS: (Signature)													
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION		TPH	PAH	LOILEOZ	EDB	Pb		
	2/5/92	0810		X	EQUIP BLANK	8	1	2	2	2	1		
	2/5/92	1327		X	MW 5	8	1	2	2	2	1		
	2/5/92	1328		X	MW 4	8	1	2	2	2	1		
	2/5/92	1247		X	MW 6	8	1	2	2	2	1		
	2/5/92	1245		X	MW 3	8	1	2	2	2	1		
	2/5/92	1327		X	DUPLICATE	8	1	2	2	2	1		
	2/5/92	1409		X	MW 9	8	1	2	2	2	1		
	2/5/92	1458		X	MW 2	8	1	2	2	2	1		
	2/5/92	1600		X	MW 8	8	1	2	2	2	1		
	2/5/92	1600		X	MW 7	8	1	2	2	2	1		
	2/5/92	1923		X	MW-10D	8	1	2	2	2	1		
	2/5/92	1923		X	MW-1	8	1	2	2	2	1		
Relinquished by: (Signature)						Date / Time		Received by: (Signature)		Date / Time		Received by: (Signature)	
Robert Thompson						1/30/92		Roger Dunbar		2/5/92 1830		Robert Thompson 1015	
Relinquished by: (Signature)						Date / Time		Received by: (Signature)		Date / Time		Received by: (Signature)	
Relinquished by: (Signature)						Date / Time		Received for Laboratory by: (Signature)		Date / Time		Remarks	

Distribution Original Accompanies Shipment. Copy returned with Report.

**GROUNDWATER SAMPLE ANALYSES**

**April 23, 1992**



WADSWORTH/ALERT  
LABORATORIES

5910 Breckenridge Pkwy., Suite H, Tampa, FL 33610

Sampling, testing, mobile labs

Since 1938

---

ANALYTICAL REPORT

SUBCONTRACT NUMBER: 1-08-134

TASK ORDER NUMBER: 0015, MOD. 0001

NAS/NADEP PENSACOLA

Presented to:

PETER REDFERN

ABB ENVIRONMENTAL SERVICES, INC.

WADSWORTH/ALERT LABORATORIES

5910 BRECKENRIDGE PARKWAY, SUITE H

TAMPA, FL 33610

(813) 621-0784

Dan Henson  
Project Manager

Randall C. Grubbs  
Laboratory Director - Florida

May 12, 1992



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Cleveland, OH 44131  
(216) 642-9151

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Lexington, SC 29072  
(803) 957-8590

REGIONAL  
LABORATORY  
5910 Breckenridge Pkwy  
Suite H  
Tampa, FL 33610  
(813) 621-0784



WADSWORTH/ALERT  
LABORATORIES

### INVOLVEMENT

This report summarizes the analytical results of the NAS/NADEP Pensacola site submitted by ABB Environmental Services, Inc. to Wadsworth/ALERT Laboratories who provided independent, analytical services for this project under the direction of Peter Redfern. The samples were accepted into Wadsworth's Florida facility on 24 April 1992, in accordance with documented sample acceptance procedures. The associated analytical methods and sample results are outlined sequentially in this report.

Analytical results included in this report have been reviewed for compliance with the Laboratory QA/QC Plan as summarized in the Quality Control Section at the rear of the report. Sample custody documentation describing the number of samples and sample matrices is also included. Any qualifications and/or non-compliant items have been noted below.



WADSWORTH/ALERT  
LABORATORIES

### ANALYTICAL METHODS

Wadsworth/ALERT Laboratories utilizes only USEPA approved analytical methods and instrumentation. The analytical methods utilized for the analysis of these samples are listed below.

#### PARAMETER

#### METHOD

#### ORGANICS

Volatile Organics

\*\* EPA Method 601/2

Ethylene Dibromide

\*\* EPA Method 601 Mod.

Polynuclear Aromatic Hydrocarbons

\*\* EPA Method 625

#### METALS

Lead

\*\* EPA Method 239.2

#### MISCELLANEOUS

Tot. Rec. Petroleum Hydrocarbons

\*\* EPA Method 418.1

NOTE: \*\* Indicates usage of this method to obtain results for this report.  
EPA Methods -Methods for Chemical Analysis of Water and Wastes, USEPA,

600/4-79-020, March, 1983. July, 1982

Drinking Waters USEPA, 600/4-88/039, December, 1988.

Std. Methods -Standard Methods for the Examination of Water and Waste-  
water, APHA, 16th edition, 1985.

USEPA Methods -From 40CFR Part 136, published in Federal Register on  
October 26, 1984.

SW846 Methods -Test Methods for Evaluating Solid Waste Physical/Chemical  
Methods, 3rd Edition, USEPA, 1986.

ASTM Methods -American Society for Testing and Materials.

NIOSH Method -NIOSH Manual of Analytical Methods, National Institute for  
Occupational Safety and Health, 2nd Edition, April 1977.



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-2  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 5/92

SAMPLE ID: MW 1

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	4
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	25
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	107	(78-122)
Trifluorotoluene (PID)	102	(73-131)





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-2  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 4/29/92

SAMPLE ID: MW 1

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	94



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-2  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: MW 1

NADEP PEN

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5  
ND\* (None Detected, lower detectable limit =  
-- (Not Analyzed)

ug/L) as rec'd  
ug/L) as rec'd

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	62	(22-135)	(10-155)
Fluorobiphenyl	56	(34-140)	(12-153)
Terphenyl-d14	23	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-2  
MATRIX : WATER

DATE RECEIVED: 4/24/92

SAMPLE ID : MW 1

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	5/ 6/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-2  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: MW 1                      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	3	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-3  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 6/92

SAMPLE ID: MW 2

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602. - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	1
2-Chloroethylvinyl ether	ND	Methylene chloride	12 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	2
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	100	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-3  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 4/30/92

SAMPLE ID: MW 2

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	78



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-3  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: MW 2

NADEP PEN

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	7
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	24
2-Methylnaphthalene	18
Naphthalene	7
Phenanthrene	10
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	50	(22-135)	(10-155)
Fluorobiphenyl	29	(34-140)	(12-153)
Terphenyl-d14	11	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-3  
MATRIX : WATER

DATE RECEIVED: 4/24/92

SAMPLE ID : MW 2      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	5/ 6/92	ND	5 ug/L

NOTE: ND (None Detected)





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-3  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: MW 2                      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	14	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-4  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 5/92

SAMPLE ID: MW 3

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	1
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	109	(78-122)
Trifluorotoluene (PID)	99	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-4  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 4/29/92

SAMPLE ID: MW 3

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	85



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-4  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: MW 3

NADEP PEN

CERTIFICATION #: E84059

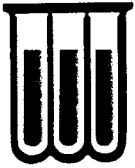
POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	53	(22-135)	(10-155)
Fluorobiphenyl	49	(34-140)	(12-153)
Terphenyl-d14	21	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-4  
MATRIX : WATER

DATE RECEIVED: 4/24/92

SAMPLE ID : MW 3

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

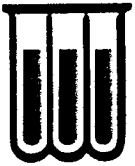
**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	5/ 6/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-4  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: MW 3                      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-5  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 5/92

SAMPLE ID: MW 4

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	4
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromchloromethane (HECD)	107	(78-122)
Trifluorotoluene (PID)	98	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-5  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 4/29/92

SAMPLE ID: MW 4

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	105





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-5  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: MW 4

NADEP PEN

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

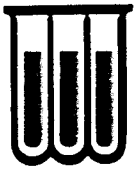
HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5  
ND\* (None Detected, lower detectable limit =  
-- (Not Analyzed)

ug/L) as rec'd  
ug/L) as rec'd

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	40	(22-135)	(10-155)
Fluorobiphenyl	41	(34-140)	(12-153)
Terphenyl-d14	24	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-5  
MATRIX : WATER

DATE RECEIVED: 4/24/92

SAMPLE ID : MW 4

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	5/ 6/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-5  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: MW 4                      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-6  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 5/92

SAMPLE ID: MW 5

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	112	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-6  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 4/29/92

SAMPLE ID: MW 5

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	100



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-6  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: MW 5

NADEP PEN

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5  
ND\* (None Detected, lower detectable limit =  
-- (Not Analyzed)

ug/L) as rec'd  
ug/L) as rec'd

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	63	(22-135)	(10-155)
Fluorobiphenyl	57	(34-140)	(12-153)
Terphenyl-d14	28	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-6  
MATRIX : WATER

DATE RECEIVED: 4/24/92

SAMPLE ID : MW 5

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	5/ 6/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-6  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: MW 5                      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-7  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 5/92

SAMPLE ID: MW 6

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	115	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-7  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: MW 6

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 5 ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	52	(22-135)	(10-155)
Fluorobiphenyl	51	(34-140)	(12-153)
Terphenyl-d14	25	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-7  
MATRIX : WATER

DATE RECEIVED: 4/24/92

SAMPLE ID : MW 6

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	5/ 6/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-7  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 4/29/92

SAMPLE ID: MW 6

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	95



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-7  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: MW 6                      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-8  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 5/92

SAMPLE ID: MW 7

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	118	(78-122)
Trifluorotoluene (PID)	97	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-8  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: MW 7

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	92



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-8  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 2/92

SAMPLE ID: MW 7

NADEP PEN

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5  
ND\* (None Detected, lower detectable limit =  
-- (Not Analyzed)

ug/L) as rec'd  
ug/L) as rec'd

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	53	(22-135)	(10-155)
Fluorobiphenyl	49	(34-140)	(12-153)
Terphenyl-d14	26	(10-132)	(13-140)





WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-8  
MATRIX : WATER

DATE RECEIVED: 4/24/92

SAMPLE ID : MW 7

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	5/ 6/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-8  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: MW 7                      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-9  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 6/92

SAMPLE ID: MW 8

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	10 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	7
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromchloromethane (HECD)	100	(78-122)
Trifluorotoluene (PID)	99	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-9  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: MW 8

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	97



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-9  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 2/92

SAMPLE ID: MW 8

NADEP PEN

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	52	(22-135)	(10-155)
Fluorobiphenyl	50	(34-140)	(12-153)
Terphenyl-d14	22	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-9  
MATRIX : WATER

DATE RECEIVED: 4/24/92

SAMPLE ID : MW 8

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	5/ 6/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-9  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: MW 8                      NADEP PEN

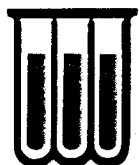
CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

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	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-10  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 6/92

SAMPLE ID: MW 9

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

---

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	13 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	100	(78-122)
Trifluorotoluene (PID)	98	(73-131)





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-10  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: MW 9

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	105



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-10  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 2/92

SAMPLE ID: MW 9

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5  
ND\* (None Detected, lower detectable limit =  
-- (Not Analyzed)

ug/L) as rec'd  
ug/L) as rec'd

**SURROGATE RECOVERY:**

**%**

**ACCEPTABLE LIMITS**

Nitrobenzene-d5  
Fluorobiphenyl  
Terphenyl-d14

57  
57  
27

WATER	SOLID
(22-135)	(10-155)
(34-140)	(12-153)
(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-10  
MATRIX : WATER

DATE RECEIVED: 4/24/92

SAMPLE ID : MW 9

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	5/ 6/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-10  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: MW 9

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-11  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 6/92

SAMPLE ID: MW 10D

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	4 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	100	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-11  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: MW 10D

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	99



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-11  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 2/92

SAMPLE ID: MW 10D

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	44	(22-135)	(10-155)
Fluorobiphenyl	42	(34-140)	(12-153)
Terphenyl-d14	25	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-11  
MATRIX : WATER

DATE RECEIVED: 4/24/92

SAMPLE ID : MW 10D

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	5/ 6- 5/ 7/92	ND	5 ug/L

NOTE: ND (None Detected)





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-11  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: MW 10D                      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-12  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 6/92

SAMPLE ID: MW 11

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	2
2-Chloroethylvinyl ether	ND	Methylene chloride	11 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	9
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	100	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-12  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: MW 11

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	115



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-12  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 2/92

SAMPLE ID: MW 11

NADEP PEN

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	13
2-Methylnaphthalene	13
Naphthalene	5
Phenanthrene	5
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5  
ND\* (None Detected, lower detectable limit =  
-- (Not Analyzed)

ug/L) as rec'd  
ug/L) as rec'd

SURROGATE RECOVERY:

%

ACCEPTABLE LIMITS

Nitrobenzene-d5  
Fluorobiphenyl  
Terphenyl-d14

56  
56  
28

WATER	SOLID
(22-135)	(10-155)
(34-140)	(12-153)
(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-12  
MATRIX : WATER

DATE RECEIVED: 4/24/92

SAMPLE ID : MW 11

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	5/ 6- 5/ 7/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-12  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: MW 11                      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	4	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-13  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 6/92

SAMPLE ID: MW 12

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	1	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	4
2-Chloroethylvinyl ether	ND	Methylene chloride	10 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	12
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromchloromethane (HECD)	100	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-13  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: MW 12

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	91





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-13  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 2/92

SAMPLE ID: MW 12

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	22
2-Methylnaphthalene	23
Naphthalene	13
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	56	(22-135)	(10-155)
Fluorobiphenyl	56	(34-140)	(12-153)
Terphenyl-d14	22	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-13  
MATRIX : WATER

DATE RECEIVED: 4/24/92

SAMPLE ID : MW 12

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	5/ 6- 5/ 7/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-13  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: MW 12                      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	1	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-14  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 6/92

SAMPLE ID: DUPLICATE 1

NADEP PEN

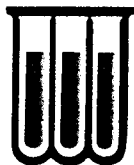
CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	11 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	100	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-14  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: DUPLICATE 1      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	81



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-14  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 2/92

SAMPLE ID: DUPLICATE 1      NADEP PEN

CERTIFICATION #: E84059  
POLYNUCLEAR AROMATIC HYDROCARBONS      HRS84297  
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	51	(22-135)	(10-155)
Fluorobiphenyl	50	(34-140)	(12-153)
Terphenyl-d14	22	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-14  
MATRIX : WATER

DATE RECEIVED: 4/24/92

SAMPLE ID : DUPLICATE 1

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	5/ 6- 5/ 7/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-14  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: DUPLICATE 1      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-15  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 6/92

SAMPLE ID: DUPLICATE 2

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	11 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	100	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-15  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: DUPLICATE 2

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

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PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	79



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-15  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 2/92

SAMPLE ID: DUPLICATE 2

NADEP PEN

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5  
ND\* (None Detected, lower detectable limit =  
-- (Not Analyzed)

ug/L) as rec'd  
ug/L) as rec'd

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	50	(22-135)	(10-155)
Fluorobiphenyl	51	(34-140)	(12-153)
Terphenyl-d14	19	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-15  
MATRIX : WATER

DATE RECEIVED: 4/24/92

SAMPLE ID : DUPLICATE 2

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	5/ 6- 5/ 7/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-15  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: DUPLICATE 2                      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-16  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 6/92

SAMPLE ID: EQUIPMENT BLANK

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	12 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	100	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-16  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: EQUIPMENT BLANK      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	88



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-16  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 5/92

SAMPLE ID: EQUIPMENT BLANK

NADEP PEN

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS

HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5  
ND\* (None Detected, lower detectable limit =  
-- (Not Analyzed)

ug/L) as rec'd  
ug/L) as rec'd

SURROGATE RECOVERY:

%

ACCEPTABLE LIMITS

Nitrobenzene-d5  
Fluorobiphenyl  
Terphenyl-d14

74  
72  
61

WATER	SOLID
(22-135)	(10-155)
(34-140)	(12-153)
(10-132)	(13-140)





WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-16  
MATRIX : WATER

DATE RECEIVED: 4/24/92

SAMPLE ID : EQUIPMENT BLANK

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	5/ 6- 5/ 7/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-16  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: EQUIPMENT BLANK                      NADEP PEN

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-17  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 6/92

SAMPLE ID: TRIP BLANK

NADEP PEN

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	11 B
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	100	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES

## **QUALITY CONTROL SECTION**

- Quality Control Summary
- Laboratory Blanks
- Laboratory Control Sample
- Matrix Spike/Matrix Spike Duplicate Results
- Sample Custody Documentation



WADSWORTH/ALERT  
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL  
PROGRAM SUMMARY

Wadsworth/ALERT Laboratories considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with various analytical result reports. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow.

Surrogate Spike Recovery Evaluations

Known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added, as appropriate, to routine GC and GC/MS sample fractions prior to extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is an indication of the overall method efficiency for the individual sample. This surrogate spike recovery data is displayed alongside acceptable analytical method performance limits at the bottom of each applicable analytical result report sheet.

NOTE: Acceptable method performance for Base/Neutral Acid extractables is indicated by two (2) of three (3) surrogates for each fraction with a minimum recovery of ten (10) percent each. For Pesticides one (1) of two (2) surrogates meeting performance criteria is acceptable.

Laboratory Analytical Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interferences and background contamination levels associated with each analytical method. These method blanks include all aspects of actual laboratory method analysis (chemical reagents, glassware, etc.), substituting laboratory reagent water or solid for actual sample. The method blank must not contain any analytes above the reported detection limit. The following common laboratory contaminants are exceptions to this rule provided they are not present at greater than five times the detection limit.

Volatiles

Methylene chloride  
Toluene  
2-Butanone  
Acetone

Semi-volatiles

Dimethyl phthalate  
Diethyl phthalate  
Di-n-butyl phthalate  
Butyl benzyl phthalate  
Bis (2-ethylhexyl) phthalate

Metals

Calcium  
Magnesium  
Sodium

A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method blanks.

Laboratory Analytical Method Check Sample Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to a laboratory reagent blank prior to extraction and analysis. Percent recovery determinations demonstrate the performance of the analytical method. Failure of a check sample to meet established laboratory recovery criteria is cause to stop the analysis until the problem is resolved.



WADSWORTH/ALERT  
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL  
PROGRAM SUMMARY  
(cont'd)

At that time all associated samples must be re-analyzed. A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method check samples.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to two of three separate aliquots of a sequentially predetermined sample prior to extraction and analysis. Percent recovery determinations are calculated from both of the spiked samples by comparison to the actual values generated from the unspiked sample. These percent recovery determinations indicate the accuracy of the analysis at recovering actual analytical method compounds from the matrix. Relative percent difference determinations calculated from a comparison of the MS/MSD recoveries demonstrate the precision of the analytical method. Actual percent recovery and relative percent difference data is displayed alongside their respective acceptable analytical method performance limits in the QA/QC section of the report. The MS/MSD are considered in control when the precision is within established control limits and the associated check sample has been found to be acceptable. A minimum of ten percent (10%) of all analyses are MS/MSD quality control samples.

\*\*\*\*\*EXAMPLE\*\*\*\*\*

COMPOUND	SAMPLE CONC.	MS %REC	MSD %REC	RPD	QC LIMITS	
					RPD	RECOVERY
4,4'-DDT	0	95	112	16	22	66-119
Benzene	10	86	93	8	20	39-150
(cmpd. name)	sample result	1st% recov.	2nd% recov.	Rel.% diff.	accep. method perform range	

Analytical Result Qualifiers

The following qualifiers, as defined below, may be appended to analytical results in order to allow proper interpretation of the results presented:

J - indicates an estimated concentration (typically used when a dilution, matrix interference or instrumental limitation prevents accurate quantitation of a particular analyte).

B - indicates the presence of a particular analyte in the laboratory blank analyzed concurrently with the samples. Results must be interpreted accordingly.

DIL - indicates that because of matrix interferences and/or high analyte concentrations, it was necessary to dilute the sample to a point where the surrogate or spike concentrations fell below a quantifiable amount and could not be reported.



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-BK  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	97	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-BK  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 5/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	5
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	100	(78-122)
Trifluorotoluene (PID)	100	(73-131)





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2D2404-BK  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 8/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	3
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	105	(78-122)
Trifluorotoluene (PID)	101	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-BK  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 4/29/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	85



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-BK  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 4/30/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	96



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-BK  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromochloromethane	(78-122)	(49-121)	80



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2D2404-BK  
MATRIX: WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 4/27/92  
DATE ANALYZED: 5/ 1/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
POLYNUCLEAR AROMATIC HYDROCARBONS  
METHOD 625 HSL/TCL LIST - GC/MS  
HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5  
ND\* (None Detected, lower detectable limit =  
-- (Not Analyzed)

ug/L) as rec'd  
ug/L) as rec'd

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	66	(22-135)	(10-155)
Fluorobiphenyl	59	(34-140)	(12-153)
Terphenyl-d14	51	(10-132)	(13-140)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.

DATE RECEIVED: 4/24/92

LAB #: 2D2404-BK

MATRIX : WATER

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	5/ 6/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB ID: 2D2404-BK  
MATRIX : WATER

DATE RECEIVED: 4/24/92  
DATE EXTRACTED: 5/ 4/92  
DATE ANALYZED: 5/ 4/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

**TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT**

---

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

LAB ID : LCS  
MATRIX : WATER  
METHOD : 601/2  
RUN ID : MA/MB00379

DATE EXTRACTED: N/A  
DATE ANALYZED : 05/04/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL	LCS	QC LIMITS
	RUN ID #	%REC	RPD %REC
-----			
Benzene	MA/MB00379	104	15 70-117
Toluene		106	16 70-117
Chlorobenzene		92	24 58-133
1,1-Dichloroethene		113	28 43-131
Trichloroethene		115	13 75-123
Dichlorobromomethane		94	22 61-133





WADSWORTH/ALERT  
LABORATORIES

LAB ID : LCS  
MATRIX : WATER  
METHOD : 601/2  
RUN ID : SA/SB00243A

DATE EXTRACTED: N/A  
DATE ANALYZED : 05/05/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS	QC LIMITS
		%REC	RPD %REC
Benzene	SA/SB00243A	96	15 70-117
Toluene		101	16 70-117
Chlorobenzene		86	24 58-133
1,1-Dichloroethene		99	28 43-131
Trichloroethene		99	13 75-123
Dichlorobromomethane		79	22 61-133



WADSWORTH/ALERT  
LABORATORIES

LAB ID : LCS  
MATRIX : WATER  
METHOD : 601 Mod.  
RUN ID : 535

DATE EXTRACTED: N/A  
DATE ANALYZED : 04/29/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS	
			RPD	%REC
Ethylene Dibromide	535	105	25	81-135



WADSWORTH/ALERT  
LABORATORIES

LAB ID : LCS  
MATRIX : WATER  
METHOD : 601/2  
RUN ID : MA/MB00458

DATE EXTRACTED: N/A  
DATE ANALYZED : 05/08/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS	QC LIMITS
		%REC	RPD %REC
Benzene	MA/MB00458	104	15 70-117
Toluene		109	16 70-117
Chlorobenzene		98	24 58-133
1,1-Dichloroethene		76	28 43-131
Trichloroethene		91	13 75-123
Dichlorobromomethane		76	22 61-133



WADSWORTH/ALERT  
LABORATORIES

LAB ID : LCS  
MATRIX : WATER  
METHOD : 601 Mod.  
RUN ID : 559

DATE EXTRACTED: N/A  
DATE ANALYZED : 04/30/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD %REC
Ethylene Dibromide	559	124	25 81-135



WADSWORTH/ALERT  
LABORATORIES

LAB ID : LCS  
MATRIX : WATER  
METHOD : 601 Mod.  
RUN ID : 566

DATE EXTRACTED: N/A  
DATE ANALYZED : 05/01/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS	
			RPD	%REC
Ethylene Dibromide	566	113	25	81-135



WADSWORTH/ALERT  
LABORATORIES

LAB ID : LCS  
MATRIX : WATER  
METHOD : 625  
RUN ID : S9468

DATE EXTRACTED: 04/27/92  
DATE ANALYZED : 05/01/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS	
			RPD	%REC
Acenaphthene	S9468	65	36	31-105
Pyrene		42	32	12-108



WADSWORTH/ALERT  
LABORATORIES

LAB ID : LCS

MATRIX : WATER

LABORATORY CONTROL SAMPLE RESULTS  
METALS

ELEMENT	DATE	DATE	LCS	QC LIMITS	
	PREPARED	ANALYZED	%REC	RPD	%REC
Lead (furnace)	05/06/92	05/06/92	91	33 64-132	LCS



WADSWORTH/ALERT  
LABORATORIES

LAB ID : LCS

MATRIX : WATER

LABORATORY CONTROL SAMPLE RESULTS  
WET CHEMISTRY

PARAMETER	DATE PREPARED	DATE ANALYZED	LCS %REC	QC LIMITS RPD %REC	
TRPH (IR)	05/04/92	05/04/92	121	24 75-124	LCS





WADSWORTH/ALERT  
LABORATORIES

LAB ID : 2D2404-4  
MATRIX : WATER  
METHOD : 601/2  
RUN ID : MA/MB00459/00460

DATE RECEIVED : 04/24/92  
DATE PREPARED : N/A  
DATE ANALYZED : 05/08/92

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS	MSD	RPD	QC LIMITS	
		%REC	%REC		RPD	%REC
1,1-Dichloroethene	MA/MB00459/00460	76	85	11	28	43-131
Trichloroethene		85	89	5	13	75-123
Chlorobenzene		98	98	0	24	58-133
Toluene		110	111	1	16	70-117
Benzene		101	103	2	15	70-117
Dichlorobromomethane		71	77	8	22	61-133

\* - Diluted Out



WADSWORTH/ALERT  
LABORATORIES

LAB ID : 2D2404-5  
MATRIX : WATER  
METHOD : 601 Mod.  
RUN ID : 568

DATE RECEIVED : 04/24/92  
DATE PREPARED : N/A  
DATE ANALYZED : 05/01/92

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS %REC	MSD %REC	RPD	QC LIMITS RPD %REC
Ethylene Dibromide	568	82	105	25	25 81-135

\* - Diluted Out



WADSWORTH/ALERT  
LABORATORIES

LAB ID : 2D2404-8  
MATRIX : WATER  
METHOD : 625  
RUN ID : S9476/S9477

DATE RECEIVED : 04/24/92  
DATE PREPARED : 04/27/92  
DATE ANALYZED : 05/02/92

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS %REC	MSD %REC	RPD	QC LIMITS RPD %REC
Acenaphthene	S9476/S9477	62	61	2	24 57-104
Pyrene		37	40	8	30 58-148

\* - Diluted Out

WADSWORTH/ALERT LABORATORIES  
SAMPLE SHIPPER EVALUATION AND RECEIPT FORM

Client: ABB. Env. Services Project Name/Number: NAJ/NADEP Pensacola

Samples Received By: Danny Hens Date Received: 4-24-92  
(Signature)

Sample Evaluation Form By: Danny Hens LAB No: 4330/202404-1617  
(Signature)

Type of shipping container samples received in? WAL Cooler ☒

Client Cooler ☐ WAL Shipper ☐ Box ☐ Other ☐

Any "NO" responses or discrepancies should be explained in comments section.

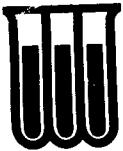
- |  | YES                                 | NO                                  |
|--|-------------------------------------|-------------------------------------|
| 1. Were custody seals on shipping container(s) intact? . . . . .   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 2. Were custody papers properly included with samples? . . . . .   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 3. Were custody papers properly filled out (ink, signed, match labels)? . . . . .  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 4. Did all bottles arrive in good condition (unbroken)? . . . . .  | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 5. Were all bottle labels complete (Sample No., date, signed, analysis preservatives)? . . . . .                                   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 6. Were correct bottles used for the tests indicated? . . . . .  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 7. Were proper sample preservation techniques indicated? . . . . .   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 8. Were samples received within adequate holding time? . . . . .   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 9. Were all VOA bottles checked for the presence of air bubbles? (If air bubbles were found indicate in comment section) . . . . . | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 10. Were samples in direct contact with wet ice? . . . . . (NOTE TEMPERATURE BELOW)  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| 11. Were samples accepted into the laboratory? . . . . . (If no see comments)  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |

Cooler # <u>161</u> Temp <u>3</u> °C	Cooler # <u>164</u> Temp <u>5</u> °C
Cooler # <u>149</u> Temp <u>5</u> °C	Cooler # <u>171</u> Temp <u>6</u> °C
Cooler # <u>72</u> Temp <u>4</u> °C	

Comments: \_\_\_\_\_

One EDB unl broken for mw-5.

No Parameters listed on CoC - bottles say 601/602, EOB, PAH, TRPH + Pb



**WADSWORTH/ALERT  
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Sampling, testing, mobile labs

5910 Breckenridge Pkwy.  
Suite H  
Tampa, FL 33610

(813) 621-0784  
Fax (813) 623-6021

# Chain of Custody Record

Record \_\_\_\_\_ of \_\_\_\_\_

# 08194

Client:		Project Name / Location			No. Of CON-TAINERS	Parameter										Remarks	
Sampler(s)		Project #:				VOC -	PAH -	METALS -	TRPH -	EDB -							
Item #	Date	Time	MATRIX	Sample Location													
1	1/12/02	1:00	MR	1001	5	1		1									
2	1/12/02	1:05	MR	1002	5	1		1									
3	1/12/02	1:00	MR	1007	5	2		1									
4	1/12/02	1:05	MR	1008	5	2		1									
5	1/12/02	1:05	MR	1009	5	2		1									
6	1/12/02	1:05	MR	1010	5	2		1									
7	1/12/02	1:00	MR	1013	5	1		1									
8	1/12/02	1:05	MR	1015	5	1		1									
9	1/12/02	1:10	MR	1011	5	1		1									
10	1/12/02	1:00	MR	1005	7	2											
11																	

Total Containers

Number of Coolers in Shipment

Bailers

Report To:

Transfer Number

Item Number(s)

Relinquished By / Company

Accepted By / Company

Date

Time

Additional Comments:

1

2

3

4

5

6

Original Accompanies Shipment



WADSWORTH/ ~~LETT~~ Laboratories

LAB ID : 2H2912-6  
MATRIX : WATER

DATE RECEIVED : 08/29/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY  
INORGANIC PARAMETERS - METALS

ELEMENT	DATE PREPARED	DATE ANALYZED	MS %REC	MSD %REC	RPD	QC LIMITS RPD %REC	LAB ID
Lead (furnace)	09/07/92	09/09/92	108	108	0	24 76-124	2H2912-6

\* = Diluted out



WADSWORTH/ALERT  
LABORATORIES

LAB#: 2A2811-1  
MATRIX: WATER

DATE RECEIVED: 01/28/92  
DATE PREP'D: 01/30/92  
DATE ANALYZED: 01/30/92

**MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY  
INORGANIC PARAMETERS - METALS**

COMPOUND	MS	MSD	RPD	QC LIMITS	
	%REC	%REC		RPD	RECOVERY
Lead, furnace	94	94	0	24	76-124

**WADSWORTH/ALERT LABORATORIES  
SAMPLE SHIPPER EVALUATION AND RECEIPT FORM**

Client: ABB Project Name/Number: NADEP-Pensacola  
Samples Received By: Carol Mc Nulty Date Received: 1/28/92  
(Signature)  
Sample Evaluation Form By: Carol Mc Nulty LAB No: 3742/2A2811-157  
(Signature)

Type of shipping container samples received in? WAL Cooler X

Client Cooler      WAL Shipper      Box      Other     

Any "NO" responses or discrepancies should be explained in comments section.

	YES	NO
1. Were custody seals on shipping container(s) intact? . . . . .	<u>X</u>	<u>    </u>
2. Were custody papers properly included with samples? . . . . .	<u>X</u>	<u>    </u>
3. Were custody papers properly filled out (ink, signed, match labels)? . . . . .	<u>X</u>	<u>    </u>
4. Did all bottles arrive in good condition (unbroken)? . . . . .	<u>X</u>	<u>    </u>
5. Were all bottle labels complete (Sample No., date, signed, analysis preservatives)? . . . . .	<u>X</u>	<u>    </u>
6. Were correct bottles used for the tests indicated? . . . . .	<u>X</u>	<u>    </u>
7. Were proper sample preservation techniques indicated? . . . . .	<u>X</u>	<u>    </u>
8. Were samples received within adequate holding time? . . . . .	<u>X</u>	<u>    </u>
9. Were all VOA bottles checked for the presence of air bubbles? (If air bubbles were found indicate in comment section) . . . . .	<u>X</u>	<u>    </u>
10. Were samples in direct contact with wet ice? (NOTE TEMPERATURE BELOW) . . . . .	<u>X</u>	<u>    </u>
11. Were samples accepted into the laboratory? (If no see comments) . . . . .	<u>X</u>	<u>    </u>

Cooler #      Temp 5 °C      Cooler #      Temp      °C  
Cooler #      Temp      °C      Cooler #      Temp      °C

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



5910-H BRECKENRIDGE PARKWAY/TAMPA, FL 33610  
(813) 621-0784

**№ 4807**

[illegible]

**GROUNDWATER SAMPLE ANALYSES**

**February 6, 1992**



Since 1938

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LABORATORIES** 5910 Breckenridge Pkwy., Suite H, Tampa, FL 33610

Sampling, testing, mobile labs

---

**ANALYTICAL REPORT**

**SUBCONTRACT NUMBER: 1-08-134**

**TASK ORDER NUMBER: 0015**

**NAS/NADEP PENSACOLA - PHASE I**

**Presented to:**

**ROGER DURHAM**

**ABB ENVIRONMENTAL SERVICES, INC.**

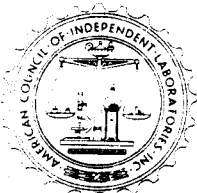
**WADSWORTH/ALERT LABORATORIES  
5910 BRECKENRIDGE PARKWAY, SUITE H  
TAMPA, FL 33610**

**813 621-0784**

**Dan Henson  
Project Manager**

**Randall C. Grubbs  
Laboratory Director - Florida**

**February 20, 1992**



**HEADQUARTERS AND  
LABORATORY**  
P.O. Box 2912  
4101 Shuffel Drive, N.W.  
North Canton, OH 44720  
(216) 497-9396

**REGIONAL  
LABORATORY**  
P.O. Box 31454  
5405 Schaaf Rd.  
Cleveland, OH 44131  
(216) 642-9151

**REGIONAL  
OFFICE**  
1445 Pisgah Church Rd.  
Lexington, SC 29072  
(803) 957-8590

**REGIONAL  
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5910 Breckenridge Pkwy  
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Tampa, FL 33610  
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**WADSWORTH/ALERT  
LABORATORIES, INC.**

5910 Breckenridge Pkwy, Suite H, Tampa, FL 33610

Sampling, testing, mobile labs

February 20, 1992

Mr. Roger Durham  
ABB Environmental Services, Inc.  
2571 Executive Center Cir. East, Suite 100  
Tallahassee, FL 32301

Dear Mr. Durham,

Over the course of the past month, it was noted that toluene has begun randomly appearing in samples, trip blanks and equipment blanks at levels ranging from about 2 ug/L to about 22 ug/L. We have investigated its presence and feel that we have located the source of this random contamination problem.

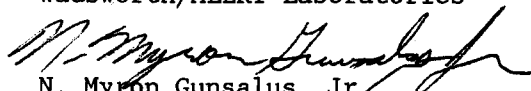
WAL began using custom printed sample container labels this past fall. At that time we evaluated the labels for any trace contaminants and found none. In late December we received a second shipment of identical labels and began using them for sampling kits sent out after 20 December 1991. The investigation of the toluene contamination led us to evaluate this second shipment of labels as well. Upon evaluation, it was found that these labels are contaminated with Toluene as well as 2-Butanone (MEK). Given that these are volatile compounds it can be demonstrated that, under certain conditions, these compounds might migrate across the septum of the sample vial.

We have discontinued use of these labels and are attempting to reissue new labels and bottles for any sample kits which are still pending. In addition we are working with the printer to determine why these labels were not made to our previously determined specifications. We have also established a policy of testing all label batches before they may be used in any kits.

The impact which these findings have on any recent or current analytical data must be determined on an individual basis. If you have any questions regarding this matter or would like to further investigate particular results, please contact your project manager or myself at (813) 621-0784. Thank you for your patience and help in this matter.

Sincerely,

Wadsworth/ALERT Laboratories

  
N. Myron Gunsalus, Jr.  
Quality Control Coordinator



HEADQUARTERS AND  
LABORATORY  
P.O. Box 2912  
4101 Shuffel Drive, N.W.  
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WADSWORTH/ALERT  
LABORATORIES

#### INVOLVEMENT

This report summarizes the analytical results of the NAS/NADEP Pensacola - Phase I site submitted by ABB Environmental Services, Inc. to Wadsworth/ALERT Laboratories who provided independent, analytical services for this project under the direction of Roger Durham. The sample was accepted into Wadsworth's Florida facility on 07 February 1992, in accordance with documented sample acceptance procedures. The associated analytical methods and sample results are outlined sequentially in this report.

Analytical results included in this report have been reviewed for compliance with the Laboratory QA/QC Plan as summarized in the Quality Control Section at the rear of the report. Sample custody documentation describing the sample matrix is also included. Any qualifications and/or non-compliant items have been noted below.



WADSWORTH/ALERT  
LABORATORIES

#### ANALYTICAL METHODS

Wadsworth/ALERT Laboratories utilizes only USEPA approved analytical methods and instrumentation. The analytical methods utilized for the analysis of these samples are listed below.

#### PARAMETER

#### METHOD

-----

#### ORGANICS

Volatile Organics

\*\* EPA Method 601/2

Ethylene Dibromide

\*\* EPA Method 601 Mod.

#### METALS

Lead

\*\* EPA Method 239.2

NOTE: \*\* Indicates usage of this method to obtain results for this report.

EPA Methods -Methods for Chemical Analysis of Water and Wastes, USEPA, 600/4-79-020, March, 1983. July, 1982  
Drinking Waters USEPA, 600/4-88/039, December, 1988.

Std. Methods -Standard Methods for the Examination of Water and Wastewater, APHA, 16th edition, 1985.

USEPA Methods -From 40CFR Part 136, published in Federal Register on October 26, 1984.

SW846 Methods -Test Methods for Evaluating Solid Waste Physical/Chemical Methods, 3rd Edition, USEPA, 1986.

ASTM Methods -American Society for Testing and Materials.

NIOSH Method -NIOSH Manual of Analytical Methods, National Institute for Occupational Safety and Health, 2nd Edition, April 1977.



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0708-1  
MATRIX: WATER

DATE RECEIVED: 2/ 7/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: MW-5

PROJ: NADEP PENSACOLA/3450S

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	4
Bromoform	ND	1,2-Dichloroethene (Total)	4
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	7
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	7
Dichlorodifluoromethane	ND	Trichlorofluoromethane	24
1,1-Dichloroethane	79	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	109	(78-122)
Trifluorotoluene (PID)	103	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0708-1  
MATRIX: WATER

DATE RECEIVED: 2/ 7/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/13/92

SAMPLE ID: MW-5

PROJ: NADEP PENSACOLA/3450S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)





WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.

DATE RECEIVED: 2/ 7/92

LAB #: 2B0708-1

MATRIX : WATER

SAMPLE ID : MW-5

PROJ: NADEP PENSACOLA/3450S

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT

HRS84297

SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	2/13/92	25	10	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0708-2  
MATRIX: WATER

DATE RECEIVED: 2/ 7/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: EQUIPMENT BLANK PROJ: NADEP PENSACOLA/3450S

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	105	(78-122)
Trifluorotoluene (PID)	104	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0708-2  
MATRIX: WATER

DATE RECEIVED: 2/ 7/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/13/92

SAMPLE ID: EQUIPMENT BLANK PROJ: NADEP PENSACOLA/3450S

CERTIFICATION #: E84059  
HRS84297

**SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT**

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0708-2  
MATRIX : WATER

DATE RECEIVED: 2/ 7/92

SAMPLE ID : EQUIPMENT BLANK PROJ: NADEP PENSACOLA/3450S

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	2/13/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0708-3  
MATRIX: WATER

DATE RECEIVED: 2/ 7/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: TRIP BLANK

PROJ: NADEP PENSACOLA/3450S

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	21
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	105	(78-122)
Trifluorotoluene (PID)	104	(73-131)



WADSWORTH/ALERT  
LABORATORIES

## **QUALITY CONTROL SECTION**

- Quality Control Summary
- Laboratory Blanks
- Laboratory Control Sample
- Matrix Spike/Matrix Spike Duplicate Results
- Sample Custody Documentation



WADSWORTH/ALERT  
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL  
PROGRAM SUMMARY

Wadsworth/ALERT Laboratories considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with various analytical result reports. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow.

Surrogate Spike Recovery Evaluations

Known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added, as appropriate, to routine GC and GC/MS sample fractions prior to extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is an indication of the overall method efficiency for the individual sample. This surrogate spike recovery data is displayed alongside acceptable analytical method performance limits at the bottom of each applicable analytical result report sheet.

NOTE: Acceptable method performance for Base/Neutral Acid extractables is indicated by two (2) of three (3) surrogates for each fraction with a minimum recovery of ten (10) percent each. For Pesticides one (1) of two (2) surrogates meeting performance criteria is acceptable.

Laboratory Analytical Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interferences and background contamination levels associated with each analytical method. These method blanks include all aspects of actual laboratory method analysis (chemical reagents, glassware, etc.), substituting laboratory reagent water or solid for actual sample. The method blank must not contain any analytes above the reported detection limit. The following common laboratory contaminants are exceptions to this rule provided they are not present at greater than five times the detection limit.

Volatiles

Methylene chloride  
Toluene  
2-Butanone  
Acetone

Semi-volatiles

Dimethyl phthalate  
Diethyl phthalate  
Di-n-butyl phthalate  
Butyl benzyl phthalate  
Bis (2-ethylhexyl) phthalate

Metals

Calcium  
Magnesium  
Sodium

A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method blanks.

Laboratory Analytical Method Check Sample Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to a laboratory reagent blank prior to extraction and analysis. Percent recovery determinations demonstrate the performance of the analytical method. Failure of a check sample to meet established laboratory recovery criteria is cause to stop the analysis until the problem is resolved.



WADSWORTH/ALERT  
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL  
PROGRAM SUMMARY  
(cont'd)

At that time all associated samples must be re-analyzed. A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method check samples.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to two of three separate aliquots of a sequentially predetermined sample prior to extraction and analysis. Percent recovery determinations are calculated from both of the spiked samples by comparison to the actual values generated from the unspiked sample. These percent recovery determinations indicate the accuracy of the analysis at recovering actual analytical method compounds from the matrix. Relative percent difference determinations calculated from a comparison of the MS/MSD recoveries demonstrate the precision of the analytical method. Actual percent recovery and relative percent difference data is displayed alongside their respective acceptable analytical method performance limits in the QA/QC section of the report. The MS/MSD are considered in control when the precision is within established control limits and the associated check sample has been found to be acceptable. A minimum of ten percent (10%) of all analyses are MS/MSD quality control samples.

\*\*\*\*\*EXAMPLE\*\*\*\*\*

COMPOUND	SAMPLE CONC.	MS	MSD	RPD	QC LIMITS	
		%REC	%REC		RPD	RECOVERY
4,4'-DDT	0	95	112	16	22	66-119
Benzene	10	86	93	8	20	39-150

(cmpd. name)	sample	1st%	2nd%	Rel.%	accep. method
	result	recov.	recov.	diff.	perform range

Analytical Result Qualifiers

The following qualifiers, as defined below, may be appended to analytical results in order to allow proper interpretation of the results presented:

J - indicates an estimated concentration (typically used when a dilution, matrix interference or instrumental limitation prevents accurate quantitation of a particular analyte).

B - indicates the presence of a particular analyte in the laboratory blank analyzed concurrently with the samples. Results must be interpreted accordingly.

DIL - indicates that because of matrix interferences and/or high analyte concentrations, it was necessary to dilute the sample to a point where the surrogate or spike concentrations fell below a quantifiable amount and could not be reported.





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0708-BK  
MATRIX: WATER

DATE RECEIVED: 2/ 7/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/12/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	118	(78-122)
Trifluorotoluene (PID)	104	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0708-BK  
MATRIX: WATER

DATE RECEIVED: 2/ 7/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/18/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	113	(78-122)
Trifluorotoluene (PID)	103	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2B0708-BK  
MATRIX: WATER

DATE RECEIVED: 2/ 7/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/13/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY: %  
Bromochloromethane (HECD) 108  
Trifluorotoluene (PID) 104

ACCEPTABLE LIMITS  
(78-122)  
(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0708-BK  
MATRIX: WATER

DATE RECEIVED: 2/ 7/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/13/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2B0708-BK  
MATRIX : WATER

DATE RECEIVED: 2/ 7/92

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	2/13/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

LAB #: 2B0708-LCS  
MATRIX: WATER  
METHOD: 601/2

DATE RECEIVED: 02/07/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/12/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
1,1-Dichloroethene	109	43-131
Trichloroethene	99	75-123
Chlorobenzene	106	58-133
Toluene	109	70-117
Benzene	111	70-117
Dichlorobromomethane	96	61-133



WADSWORTH/ALERT  
LABORATORIES

LAB #: 2B0708-LCS  
MATRIX: WATER  
METHOD: 601/2

DATE RECEIVED: 02/07/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/13/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
1,1-Dichloroethene	117	43-131
Trichloroethene	90	75-123
Chlorobenzene	101	58-133
Toluene	104	70-117
Benzene	108	70-117
Dichlorobromomethane	100	61-133



WADSWORTH/ALERT  
LABORATORIES

LAB #: 2B0708-LCS  
MATRIX: WATER  
METHOD: 601/2

DATE RECEIVED: 02/07/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/18/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
1,1-Dichloroethene	68	43-131
Trichloroethene	89	75-123
Chlorobenzene	104	58-133
Toluene	106	70-117
Benzene	105	70-117
Dichlorobromomethane	81	61-133





WADSWORTH/ALERT  
LABORATORIES

LAB #: 2B0708-LCS  
MATRIX: WATER  
METHOD: 601 Mod.

DATE RECEIVED: 02/07/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/13/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
Ethylene Dibromide	81	81-135



WADSWORTH/ALERT  
LABORATORIES

LAB #: 2B0708-LCS  
MATRIX: WATER

DATE RECEIVED: 02/07/92  
DATE PREP'D: 02/13/92  
DATE ANALYZED: 02/13/92

LABORATORY CHECK SAMPLE RECOVERY

COMPOUND	LCS %REC	QC LIMITS RECOVERY
Lead, furnace	97	64-131



WADSWORTH/ALERT  
LABORATORIES

LAB#: 2B0708-1  
MATRIX: WATER  
METHOD: 601/2

DATE RECEIVED : 02/07/92  
DATE EXTRACTED: NA  
DATE ANALYZED : 02/13/92 to  
02/18/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	MS %REC	MSD %REC	RPD	QC LIMITS RPD RECOVERY
1,1-Dichloroethene	87	68	25	28 43-131
Trichloroethene	78	88	12	13 75-123
Chlorobenzene	85	93	9	24 58-133
Toluene	112	95	16	16 70-117
Benzene	89	94	5	15 70-117
Dichlorobromomethane	68	82	19	22 61-133



WADSWORTH/ALERT  
LABORATORIES

LAB ID: 2B0708-1  
MATRIX: WATER  
METHOD: 601 Mod.

DATE RECEIVED: 02/07/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/13/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	MS	MSD	RPD	QC LIMITS	
	%REC	%REC		RPD	RECOVERY
Ethylene Dibromide	89	90	1	25	81-135



WADSWORTH/ALERT  
LABORATORIES

LAB#: 2B0708-1  
MATRIX: WATER

DATE RECEIVED: 02/07/92  
DATE PREP'D: 02/13/92  
DATE ANALYZED: 02/13/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY  
INORGANIC PARAMETERS - METALS

COMPOUND	MS %REC	MSD %REC	RPD	QC LIMITS RPD	RECOVERY
Lead, furnace	92	94	2	24	76-124

**GROUNDWATER SAMPLE ANALYSES**

**August 28, 1992**



**WADSWORTH/**  **Laboratories**  
*Division of Enseco Incorporated*

5910 Breckenridge Parkway, Suite H  
Tampa, FL 33610

813-621-0784  
FAX 813-623-6021

## ANALYTICAL REPORT

SUBCONTRACT NUMBER: 1-08-134

TASK ORDER NUMBER: 0015

NADEP PENSACOLA

Presented to:

PETER REDFERN

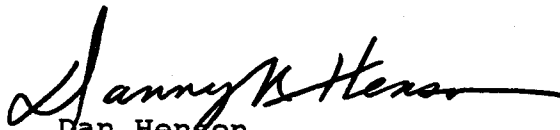
ABB ENVIRONMENTAL SERVICES, INC.

WADSWORTH/ALERT LABORATORIES

5910 BRECKENRIDGE PARKWAY, SUITE H

TAMPA, FL 33610

(813) 621-0784



Dan Henson  
Project Manager



Randall C. Grubbs  
Laboratory Director - Florida

September 14, 1992



WADSWORTH/ALERT Laboratories

### INVOLVEMENT

This report summarizes the analytical results of the NAS Pensacola site submitted by ABB Environmental Services, Inc. to Wadsworth/ALERT Laboratories who provided independent, analytical services for this project under the direction of Peter Redfern. The samples were accepted into Wadsworth's Florida facility on 29 August 1992, in accordance with documented sample acceptance procedures. The associated analytical methods and sample results are outlined sequentially in this report.

Analytical results included in this report have been reviewed for compliance with the Laboratory QA/QC Plan as summarized in the Quality Control Section at the rear of the report. Sample custody documentation describing the number of samples and sample matrices is also included. Any qualifications and/or non-compliant items have been noted below.





WADSWORTH/ALERT Laboratories

### ANALYTICAL METHODS

Wadsworth/ALERT Laboratories utilizes only USEPA approved analytical methods and instrumentation. The analytical methods utilized for the analysis of these samples are listed below.

#### PARAMETER

#### METHOD

#### ORGANICS

Volatile Organics

\*\* EPA Method 601/2

Ethylene Dibromide

\*\* EPA Method 601 Mod.

#### METALS

Lead

\*\* EPA Method 239.2

#### NOTE:

\*\* Indicates usage of this method to obtain results for this report.

(D)  
EPA Methods

Indicates draft version of this method was used  
Methods for Chemical Analysis of Water and Wastes, USEPA, 600/4-79-020, March, 1983. July, 1982

Std. Methods

Drinking Waters USEPA, 600/4-88/039, December, 1988.  
Standard Methods for the Examination of Water and Waste-water, APHA, 16th edition, 1985.

USEPA Methods

From 40CFR Part 136, published in Federal Register on October 26, 1984.

SW846 Methods

Test Methods for Evaluating Solid Waste Physical/Chemical Methods, 3rd Edition, USEPA, 1986.

ASTM Methods

American Society for Testing and Materials.

NIOSH Method

NIOSH Manual of Analytical Methods, National Institute for Occupational Safety and Health, 2nd Edition, April 1977.



WADSWORTH/ WERT Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2H2912-1  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 2/92

SAMPLE ID: MW-1

PROJ #3450S

VOLATILE ORGANICS  
METHOD 601/602 - GC

CERTIFICATION #: E84059  
HRS84297

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	3
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	1
Dichlorodifluoromethane	ND	Trichlorofluoromethane	2
1,1-Dichloroethane	24	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	109	(78-122)
Trifluorotoluene (PID)	97	(73-131)



WADSWORTH/ ~~WEST~~ Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-1  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 9/92

SAMPLE ID: MW-1

PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene Dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromoform (ECD)	(41-152)	(41-152)	80



WADSWORTH/ ~~LENT~~ Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-1  
MATRIX : WATER

DATE RECEIVED: 8/29/92

SAMPLE ID : MW-1

PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	9/ 7- 9/ 9/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ LERT Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2H2912-2  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 2/92

SAMPLE ID: MW-2

PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	1	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	4
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	1	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	94	(78-122)
Trifluorotoluene (PID)	98	(73-131)



WADSWORTH/ WET Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-2  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/10/92

SAMPLE ID: MW-2

PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene Dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromoform (ECD)	(41-152)	(41-152)	84



WADSWORTH/ ~~ERT~~ Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-2  
MATRIX : WATER

DATE RECEIVED: 8/29/92

SAMPLE ID : MW-2

PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	9/ 7- 9/ 9/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ LERT Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2H2912-3  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 3/92

SAMPLE ID: MW-3

PROJ #3450S

VOLATILE ORGANICS  
METHOD 601/602 - GC

CERTIFICATION #: E84059  
HRS84297

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	2
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	2	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	3
1,4-Dichlorobenzene	ND	Trichloroethene	4
Dichlorodifluoromethane	ND	Trichlorofluoromethane	11
1,1-Dichloroethane	33	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	96	(78-122)
Trifluorotoluene (PID)	98	(73-131)





WADSWORTH/ ~~ERT~~ Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-3  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/10/92

SAMPLE ID: MW-3

PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene Dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromoform (ECD)	(41-152)	(41-152)	97



WADSWORTH/ ~~ERT~~ Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-3  
MATRIX : WATER

DATE RECEIVED: 8/29/92

SAMPLE ID : MW-3

PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	9/ 7- 9/ 9/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ ~~LAB~~ Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2H2912-4  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 3/92

SAMPLE ID: MW-4

PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	1	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	2
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	2
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	8	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	105	(78-122)
Trifluorotoluene (PID)	98	(73-131)



WADSWORTH/ LERT Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-4  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 9/92

SAMPLE ID: MW-4

PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene Dibromide	ND	. 0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromoform (ECD)	(41-152)	(41-152)	76



WADSWORTH/ ~~LEST~~ Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-4  
MATRIX : WATER

DATE RECEIVED: 8/29/92

SAMPLE ID : MW-4

PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	9/ 7- 9/ 9/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ LEST Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2H2912-5  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 3/92

SAMPLE ID: MW-5

PROJ #3450S

VOLATILE ORGANICS  
METHOD 601/602 - GC

CERTIFICATION #: E84059  
HRS84297

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	4
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	1
Dichlorodifluoromethane	ND	Trichlorofluoromethane	4
1,1-Dichloroethane	14	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	99	(78-122)
Trifluorotoluene (PID)	98	(73-131)



WADSWORTH/ ~~LEST~~ Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-5  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 9/92

SAMPLE ID: MW-5

PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene Dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromoform (ECD)	(41-152)	(41-152)	84



WADSWORTH/ LEIT Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-5  
MATRIX : WATER

DATE RECEIVED: 8/29/92

SAMPLE ID : MW-5

PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	9/ 7- 9/ 9/92	ND	5 ug/l

NOTE: ND (None Detected)





WADSWORTH/LERT Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2H2912-6  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 3/92

SAMPLE ID: MW-6

PROJ #3450S

VOLATILE ORGANICS  
METHOD 601/602 - GC

CERTIFICATION #: E84059  
HRS84297

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	5
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	1
Dichlorodifluoromethane	ND	Trichlorofluoromethane	1
1,1-Dichloroethane	8	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	1

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	97	(78-122)
Trifluorotoluene (PID)	99	(73-131)



WADSWORTH/ ~~ERT~~ Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-6  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 9/92

SAMPLE ID: MW-6

PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene Dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromoform (ECD)	(41-152)	(41-152)	81



WADSWORTH/ ~~WERT~~ Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-6  
MATRIX : WATER

DATE RECEIVED: 8/29/92

SAMPLE ID : MW-6

PROJ #3450S

METALS ANALYTICAL REPORT  
SELECTED LIST

CERTIFICATION #: E84059  
HRS84297

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Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	9/ 7- 9/ 9/92	ND	5 ug/l

NOTE: ND (None Detected)



WADSWORTH/ ~~TEST~~ Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2H2912-7  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 3/92

SAMPLE ID: MW-7

PROJ #3450S

VOLATILE ORGANICS  
METHOD 601/602 - GC

CERTIFICATION #: E84059  
HRS84297

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	1
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	6	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	105	(78-122)
Trifluorotoluene (PID)	98	(73-131)



WADSWORTH/ ~~LEET~~ Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-7  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 9/92

SAMPLE ID: MW-7

PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene Dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromoform (ECD)	(41-152)	(41-152)	86



WADSWORTH/ ~~ERT~~ Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-7  
MATRIX : WATER

DATE RECEIVED: 8/29/92

SAMPLE ID : MW-7

PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	9/ 7- 9/ 9/92	ND	5	ug/l

NOTE: ND (None Detected)



WADSWORTH/ ~~TEST~~ Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2H2912-8  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 3/92

SAMPLE ID: DUPLICATE PROJ #3450S

VOLATILE ORGANICS  
METHOD 601/602 - GC

CERTIFICATION #: E84059  
HRS84297

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	2
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	1
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	7	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	95	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ ~~TEST~~ Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-8  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 9/92

SAMPLE ID: DUPLICATE PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene Dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromoform (ECD)	(41-152)	(41-152)	78





WADSWORTH/LETT Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-8  
MATRIX : WATER

DATE RECEIVED: 8/29/92

SAMPLE ID : DUPLICATE PROJ #3450S

METALS ANALYTICAL REPORT  
SELECTED LIST

CERTIFICATION #: E84059  
HRS84297

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	9/ 7- 9/ 9/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ LERT Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2H2912-9  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 3/92

SAMPLE ID: EQUIP BLANK PROJ #3450S

VOLATILE ORGANICS  
METHOD 601/602 - GC

CERTIFICATION #: E84059  
HRS84297

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	101	(78-122)
Trifluorotoluene (PID)	99	(73-131)



WADSWORTH/ ~~LENT~~ Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-9  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 9/92

SAMPLE ID: EQUIP BLANK PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene Dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromoform (ECD)	(41-152)	(41-152)	94



WADSWORTH/ LERT Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-9  
MATRIX : WATER

DATE RECEIVED: 8/29/92

SAMPLE ID : EQUIP BLANK PROJ #3450S

METALS ANALYTICAL REPORT  
SELECTED LIST

CERTIFICATION #: E84059  
HRS84297

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	9/ 7- 9/ 9/92	ND	5 ug/l

NOTE: ND (None Detected)



WADSWORTH/ALERT Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2H2912-10  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 3/92

SAMPLE ID: TRIP BLANK PROJ #3450S

VOLATILE ORGANICS  
METHOD 601/602 - GC

CERTIFICATION #: E84059  
HRS84297

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	1
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 1 ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY: %  
Bromochloromethane (HECD) 107  
Trifluorotoluene (PID) 99

ACCEPTABLE LIMITS  
(78-122)  
(73-131)



WADSWORTH/ ~~LEST~~ Laboratories

## QUALITY CONTROL SECTION

- Quality Control Summary
- Laboratory Blanks
- Laboratory Control Sample
- Matrix Spike/Matrix Spike Duplicate Results
- Sample Custody Documentation



WADSWORTH/ALERT Laboratories

QUALITY ASSURANCE / QUALITY CONTROL  
PROGRAM SUMMARY

Wadsworth/ALERT Laboratories considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with various analytical result reports. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow.

Surrogate Spike Recovery Evaluations

Known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added, as appropriate, to routine GC and GC/MS sample fractions prior to extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is an indication of the overall method efficiency for the individual sample. This surrogate spike recovery data is displayed alongside acceptable analytical method performance limits at the bottom of each applicable analytical result report sheet.

NOTE: Acceptable method performance for Base/Neutral Acid extractables is indicated by two (2) of three (3) surrogates for each fraction with a minimum recovery of ten (10) percent each. For Pesticides one (1) of two (2) surrogates meeting performance criteria is acceptable.

Laboratory Analytical Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interferences and background contamination levels associated with each analytical method. These method blanks include all aspects of actual laboratory method analysis (chemical reagents, glassware, etc.), substituting laboratory reagent water or solid for actual sample. The method blank must not contain any analytes above the reported detection limit. The following common laboratory contaminants are exceptions to this rule provided they are not present at greater than five times the detection limit.

Volatiles

Methylene chloride  
Toluene  
2-Butanone  
Acetone

Semi-volatiles

Dimethyl phthalate  
Diethyl phthalate  
Di-n-butyl phthalate  
Butyl benzyl phthalate  
Bis (2-ethylhexyl) phthalate

Metals

Calcium  
Magnesium  
Sodium

A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method blanks.

Laboratory Analytical Method Check Sample Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to a laboratory reagent blank prior to extraction and analysis. Percent recovery determinations demonstrate the performance of the analytical method. Failure of a check sample to meet established laboratory recovery criteria is cause to stop the analysis until the problem is resolved.



WADSWORTH/ALERT Laboratories

QUALITY ASSURANCE / QUALITY CONTROL  
PROGRAM SUMMARY

(cont'd)

At that time all associated samples must be re-analyzed. A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method check samples.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to two of three separate aliquots of a sequentially predetermined sample prior to extraction and analysis. Percent recovery determinations are calculated from both of the spiked samples by comparison to the actual values generated from the unspiked sample. These percent recovery

determinations indicate the accuracy of the analysis at recovering actual analytical method compounds from the matrix. Relative percent difference determinations calculated from a comparison of the MS/MSD recoveries demonstrate the precision of the analytical method. Actual percent recovery and relative percent difference data is displayed alongside their respective acceptable analytical method performance limits in the QA/QC section of the report. The MS/MSD are considered in control when the precision is within established control limits and the associated check sample has been found to be acceptable. A minimum of ten percent (10%) of all analyses are MS/MSD quality control samples.

\*\*\*\*\*EXAMPLE\*\*\*\*\*

COMPOUND	SAMPLE CONC.	MS %REC	MSD %REC	RPD	RPD	QC LIMITS RECOVERY
4,4'-DDT	0	95	112	16	22	66-119
Benzene	10	86	93	8	20	39-150
(cmpd. name)	sample result	1st% recov.	2nd% recov.	Rel.% diff.		accep. method perform range

Analytical Result Qualifiers

The following qualifiers, as defined below, may be appended to analytical results in order to allow proper interpretation of the results presented:

J - indicates an estimated concentration (typically used when a dilution, matrix interference or instrumental limitation prevents accurate quantitation of a particular analyte).

B - indicates the presence of a particular analyte in the laboratory blank analyzed concurrently with the samples. Results must be interpreted accordingly.

DIL - indicates that because of matrix interferences and/or high analyte concentrations, it was necessary to dilute the sample to a point where the surrogate or spike concentrations fell below a quantifiable amount and could not be reported.





WADSWORTH/ LERT Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2H2912-BK  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 2/92

SAMPLE ID: LABORATORY BLANK PROJ #3450S

VOLATILE ORGANICS  
METHOD 601/602 - GC

CERTIFICATION #: E84059  
HRS84297

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 1 ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	99	(78-122)
Trifluorotoluene (PID)	98	(73-131)



WADSWORTH/ LERT Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2H2912-BK  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 9/92

SAMPLE ID: LABORATORY BLANK PROJ #3450S

VOLATILE ORGANICS  
METHOD 601/602 - GC

CERTIFICATION #: E84059  
HRS84297

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	95	(78-122)
Trifluorotoluene (PID)	101	(73-131)



WADSWORTH/ CERT Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-BK  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/ 9/92

SAMPLE ID: LABORATORY BLANK PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene Dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromoform (ECD)	(41-152)	(41-152)	89



WADSWORTH/ ~~LETT~~ Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-BK  
MATRIX: WATER

DATE RECEIVED: 8/29/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 9/10/92

SAMPLE ID: LABORATORY BLANK PROJ #3450S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene Dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)

SURROGATE RECOVERY:	ACCEPTABLE LIMITS		%
	WATER	SOLID	
Bromoform (ECD)	(41-152)	(41-152)	108



WADSWORTH/ALERT Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2H2912-BK  
MATRIX : WATER

DATE RECEIVED: 8/29/92

SAMPLE ID : LABORATORY BLANK PROJ #3450S

METALS ANALYTICAL REPORT  
SELECTED LIST

CERTIFICATION #: E84059  
HRS84297

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	9/ 7- 9/ 9/92	ND	5	ug/l

NOTE: ND (None Detected)



WADSWORTH/ ~~ERT~~ Laboratories

LAB ID : LCS  
MATRIX : WATER  
METHOD : 601/2  
RUN ID : 2A576/2B576

DATE EXTRACTED: N/A  
DATE ANALYZED : 09/02/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS	
			RPD	%REC
Benzene	2A576/2B576	90	15	70-117
Toluene		86	16	70-117
Chlorobenzene		76	24	58-133
1,1-Dichloroethene		92	28	43-131
Trichloroethene		103	13	75-123
Dichlorobromomethane		109	22	61-133



WADSWORTH/ ~~LENT~~ Laboratories

LAB ID : LCS  
MATRIX : WATER  
METHOD : 601/2  
RUN ID : 1A/1B1518

DATE EXTRACTED: N/A  
DATE ANALYZED : 09/09/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD %REC
Benzene	1A/1B1518	100	15 70-117
Toluene		97	16 70-117
Chlorobenzene		104	24 58-133
1,1-Dichloroethene		93	28 43-131
Trichloroethene		105	13 75-123
Dichlorobromomethane		100	22 61-133



WADSWORTH/ ~~LEST~~ Laboratories

LAB ID : LCS  
MATRIX : WATER  
METHOD : 601 Mod.  
RUN ID : 219

DATE EXTRACTED: N/A  
DATE ANALYZED : 09/09/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD %REC
Ethylene Dibromide	219	93	25 81-135





WADSWORTH/ ~~EST~~ Laboratories

LAB ID : LCS  
MATRIX : WATER  
METHOD : 601 Mod.  
RUN ID : 238

DATE EXTRACTED: N/A  
DATE ANALYZED : 09/10/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD %REC
Ethylene Dibromide	238	101	25 81-135



WADSWORTH/ ERT Laboratories

LAB ID : LCS

MATRIX : WATER

LABORATORY CONTROL SAMPLE RESULTS  
METALS

ELEMENT	DATE PREPARED	DATE ANALYZED	LCS %REC	QC LIMITS	
				RPD	%REC
Lead (furnace)	09/07/92	09/09/92	112	33 64-132	LCS



WADSWORTH/LENT Laboratories

LAB ID : 2H2912-5  
MATRIX : WATER  
METHOD : 601/2  
RUN ID : 1A1523/1B1523

DATE RECEIVED : 08/29/92  
DATE PREPARED : N/A  
DATE ANALYZED : 09/09/92

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS %REC	MSD %REC	RPD	QC LIMITS RPD %REC
1,1-Dichloroethene	1A1523/1B1523	109	116	6	28 43-131
Trichloroethene		107	105	2	13 75-123
Chlorobenzene		120	118	2	24 58-133
Toluene		112	110	2	16 70-117
Benzene		116	110	5	15 70-117
Dichlorobromomethane		114	108	5	22 61-133

\* = Diluted Out

## **DISTRIBUTION**

**SOUTHNAVFACENGCOM**  
**NADEP Pensacola**

**(5)**  
**(2)**

# **CONTAMINATION ASSESSMENT REPORT**

**SITE 3450S  
NAVAL AVIATION DEPOT  
NAVAL AIR STATION  
PENSACOLA, FLORIDA**

**UIC: N00204**

**Contract No. N62467-89-D-0317**

**Prepared by:**

**ABB Environmental Services, Inc.  
2590 Executive Center Circle, East  
Tallahassee, Florida 32301**

**Author:**

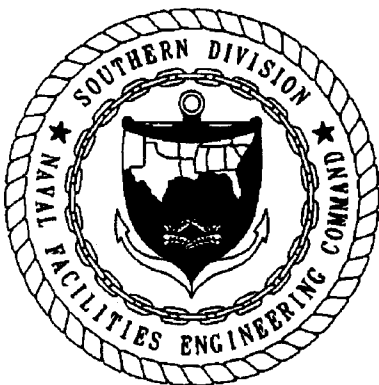
**Roger Durham**

**Prepared for:**

**Department of the Navy, Southern Division  
Naval Facilities Engineering Command  
2155 Eagle Drive  
Charleston, South Carolina 29411-0068**

**Luis Vazquez, Code 1843, Engineer-in-Charge**

**February 1993**



## FOREWORD

Subtitle I of the Hazardous and Solid Waste Amendments (HSWA) of 1984 to the Solid Waste Disposal Act (SWDA) of 1965 established a national regulatory program for managing underground storage tanks (USTs) containing hazardous materials, especially petroleum products. Hazardous wastes stored in USTs were already regulated under the Resource Conservation and Recovery Act (RCRA) of 1976, which was also an amendment to SWDA. Subtitle I requires that the U.S. Environmental Protection Agency (USEPA) promulgate UST regulations. The program was designed to be administered by the individual States, who were allowed to develop more stringent standards, but not less stringent standards. Local governments were permitted to establish regulatory programs and standards that are more stringent, but not less stringent than either State or Federal regulations. The USEPA UST regulations are found in the Code of Federal Regulations, Title 40, Part 280 (40 CFR 280) (*Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks*) and Title 40, Part 281 (*Approval of State Underground Storage Tank Programs*). Title 40, Part 280, was revised and published on September 23, 1988, and became effective December 22, 1988.

The Navy's UST program policy is to comply with all Federal, State, and local regulations pertaining to USTs. This report was prepared to satisfy the requirements of the Florida Department of Environmental Regulation (FDER) Chapter 17-770, Florida Administrative Code (FAC) (*State Underground Petroleum Environmental Response*) regulations on petroleum contamination in Florida's environment as a result of spills or leaking tanks or piping.

Questions regarding this report should be addressed to the Environmental Coordinator, Naval Aviation Depot (NADEP), Naval Air Station, Pensacola, Florida, at 904-452-2320, or to Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Code 1843, at DSN 563-0613 or 803-743-0613.

## EXECUTIVE SUMMARY

During an underground storage tank (UST) removal program conducted by the U.S. Department of the Navy in 1989 and 1990, 18 sites at the Naval Aviation Depot (NADEP), Naval Air Station, Pensacola, Florida, were identified as having soil contamination exceeding State target levels for total recoverable petroleum hydrocarbons (TRPH). ABB Environmental Services, Inc. (ABB-ES), was contracted by Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform a contamination assessment for each of the 18 sites.

Site 3450S is the former location of a 1,000-gallon UST used for the storage of unleaded gasoline. The UST was installed in 1971 on the south side of Building 3450. The UST was removed from the site during the tank removal program. Two soil samples were collected from the each end at the bottom of the UST excavation. The soil samples were composited and analyzed for TRPH. The TRPH concentration of 2,700 parts per million (ppm) exceeded the State target level of 50 ppm, and warranted further investigation pursuant to Chapter 17-770, Florida Administrative Code (FAC).

Soil borings and monitoring wells were placed at the site to assess the degree and extent of soil and groundwater contamination. Three existing monitoring wells were used for assessment of groundwater contamination. Monitoring well locations are shown in the Executive Summary Figure. Soil samples were collected and analyzed by organic vapor analyzer (OVA) headspace techniques. A soil sample was also collected from the former UST location and analyzed for TRPH. Groundwater samples were collected and analyzed for constituents of the gasoline analytical group. Groundwater levels were recorded from each monitoring well to assess the direction of groundwater flow.








Two monitoring wells were installed during the contamination assessment in January 1992. Laboratory analyses of groundwater samples collected from these wells and the three existing monitoring wells indicated that concentrations of petroleum constituents in groundwater were below State target levels; however, eight chlorinated compounds were identified in the groundwater samples. Two of these compounds, trichloroethene (TCE) and 1,1,2-trichloroethane, were detected at concentrations exceeding State recommended guidance concentrations in the samples collected from monitoring wells PEN-3450S-MW3 and PEN-3450S-MW5. These wells are located downgradient of the former UST location.

Because TCE and 1,1,-2-trichloroethane are not currently regulated under Chapter 17-770, FAC, guidelines, investigation at Site 3450S was held in abeyance and the Florida Department of Environmental Regulation (FDER) was notified of these findings.

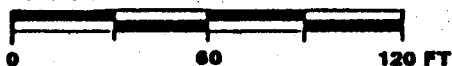
A meeting was held on June 17, 1992, with FDER and the U.S. Environmental Protection Agency (USEPA) to discuss the manner of future investigation at Site 3450S. Because the reported concentrations of TCE and 1,1,2-trichloroethane did not greatly exceed State recommended guidance concentrations, FDER and the USEPA agreed that additional site investigation should continue in accordance with Chapter 17-770, FAC, guidelines.



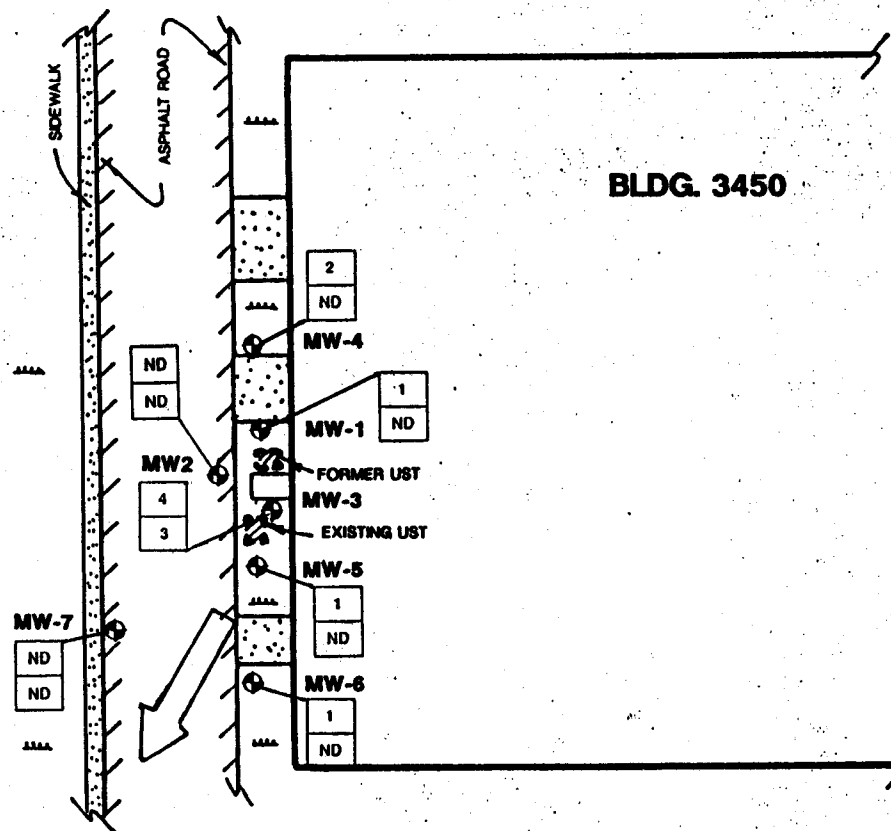
### LEGEND

-  CONCRETE SURFACE
-  ASPHALT SURFACE
-  GRASS
-  MONITORING WELL LOCATION
-  TRICHLOROETHENE CONCENTRATION (PARTS PER BILLION)
-  1,1,2-TRICHLOROETHANE CONCENTRATION (PARTS PER BILLION)
- CONCENTRATIONS IN  
PARTS PER BILLION (ppb)  
(ND DENOTES NOT DETECTED)  
CONCENTRATIONS FROM (AUGUST 28, 1992)  
SAMPLING EVENT
-  GROUNDWATER FLOW DIRECTION

### SCALE



### EXECUTIVE SUMMARY FIGURE



CONTAMINATION  
ASSESSMENT REPORT  
SITE 3450S  
NADEP PENSACOLA  
PENSACOLA, FLORIDA



The site investigation recommenced in August 1992. Five additional soil borings were drilled, and two additional monitoring wells were installed. Groundwater samples from all monitoring wells were collected on August 28, 1992, for analysis of gasoline analytical group constituents.

The findings, conclusions, and recommendations of the contamination assessment are summarized below.

#### Findings

- The groundwater flow direction at the site is east-southeast.
- OVA headspace data and laboratory analyses of soil indicate that gasoline contamination in soil at the site is minimal. No petroleum contamination was found in the soil boring at the former UST location.
- Laboratory results of groundwater samples collected August 28, 1992, indicate petroleum contamination in groundwater is minimal. Methyl tert-butyl ether (MTBE) was the only petroleum constituent detected in groundwater samples. MTBE was detected in only well PEN-3450S-MW6, at a concentration of 1 part per billion (ppb), which is well below the State target level of 50 ppb.
- The concentrations of chlorinated compounds in the groundwater generally appear to have decreased since the initial sampling event. TCE was detected in concentrations exceeding State recommended guidance concentrations in only well PEN-3450S-MW3. Concentrations of TCE in three downgradient wells were below State recommended guidance concentrations. 1,1,2-Trichloroethane was detected only in the sample collected from well PEN3450S-MW3 at a concentration of 3 ppb, which slightly exceeds the recommended guidance concentration of 1 ppb. No other compounds were detected in concentrations exceeding State target levels or recommended guidance concentrations.
- One potable water well was identified within a 0.25-mile radius of the site.

#### Conclusions

- Based on the findings, soil and groundwater petroleum contamination at the site is minimal.
- TCE and 1,1,2-trichloroethane are the only contaminants of concern detected in groundwater at the site. Because concentrations of these compounds were below State recommended guidance concentrations in three wells downgradient to well PEN-3450S-MW3, the area of concern appears to be restricted to a small area in the vicinity of well PEN-3450S-MW3. The source of TCE and 1,1,2-trichloroethane in groundwater is not presently known. Because these compounds are not constituents of unleaded gasoline (FDER, May 1989), the unleaded UST is not a likely source of these contaminants.

- The potable water well is upgradient of the site, and it does not appear that current site activities will result in the contamination of this well.

#### Recommendations

Based on the findings and conclusions discussed above, a *No Further Action Plan (NFAP)* is recommended for the unleaded gasoline UST at the site. Because TCE and 1,1,2-trichloroethane were detected in the groundwater at *diminimus* concentrations, it is recommended that this contamination be monitored for a period of one year. It is recommended that groundwater monitoring involve the quarterly sampling of all site monitoring wells. Groundwater samples should be analyzed for USEPA Method 601. Because TCE and 1,1,2-trichloroethane are not constituents of unleaded gasoline, further investigation at the site, if deemed by the State to be necessary, should not be performed under Chapter 17-770, FAC, guidelines.

## ACKNOWLEDGMENTS

In preparing this report, The Underground Storage Tank Section of the Comprehensive Long-Term Environmental Action, Navy (CLEAN) Group at ABB Environmental Services, Inc. (ABB-ES), commends the support, assistance, and cooperation provided by the personnel of the Naval Aviation Depot (NADEP), Pensacola, Florida, and Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM). In particular, ABB-ES acknowledges the effort provided by the following people during the investigation and preparation of this report.

Name	Title	Position	Location
Luis Vazquez	Environmental Engineer	Engineer-in-Charge	SOUTHNAVFACENGCOM
Danny Freeman	Environmental Coordinator	Environmental Coordinator	NADEP Pensacola

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- Appendix C: Investigative Methodologies and Procedures
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## GLOSSARY

The following list contains many of the acronyms, initialisms, abbreviations, and units of measure used in this report.

ABB-ES	ABB Environmental Services, Inc.
BETX	benzene, ethyl benzene, toluene, and xylenes
bls	below land surface
CA	Contamination Assessment
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action, Navy
CompQAP	Comprehensive Quality Assurance Plan
CTO	Contract Task Order
FAC	Florida Administrative Code
FDER	Florida Department of Environmental Regulation
FID	flame ionization detector
ft/day	feet per day
ft/ft	feet per foot
ft/min	feet per minute
GC	gas chromatograph
HSWA	Hazardous and Solid Waste Amendments of 1984
ID	inside diameter
K	hydraulic conductivity
msl	mean sea level
MTBE	methyl tert-butyl ether
n	porosity
NADEP	Naval Aviation Depot
NARF	Naval Air Rework Facility
NAS	Naval Air Station
ND	not detected
NFAP	No Further Action Plan
NGVD	National Geodetic Vertical Datum
OVA	organic vapor analyzer
POA	Plan of Action
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act

## GLOSSARY--Continued

SOUTHNAVFACENGCOM	Southern Division, Naval Facilities Engineering Command
SPT	standard penetration test
SWDA	Solid Waste Disposal Act of 1965
TCE	trichloroethene
TRPH	total recoverable petroleum hydrocarbons
UIC	uniform identification code
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
V	average pore water velocity
VOA	volatile organic aromatics
VOC	volatile organic compounds

## 1.0 INTRODUCTION

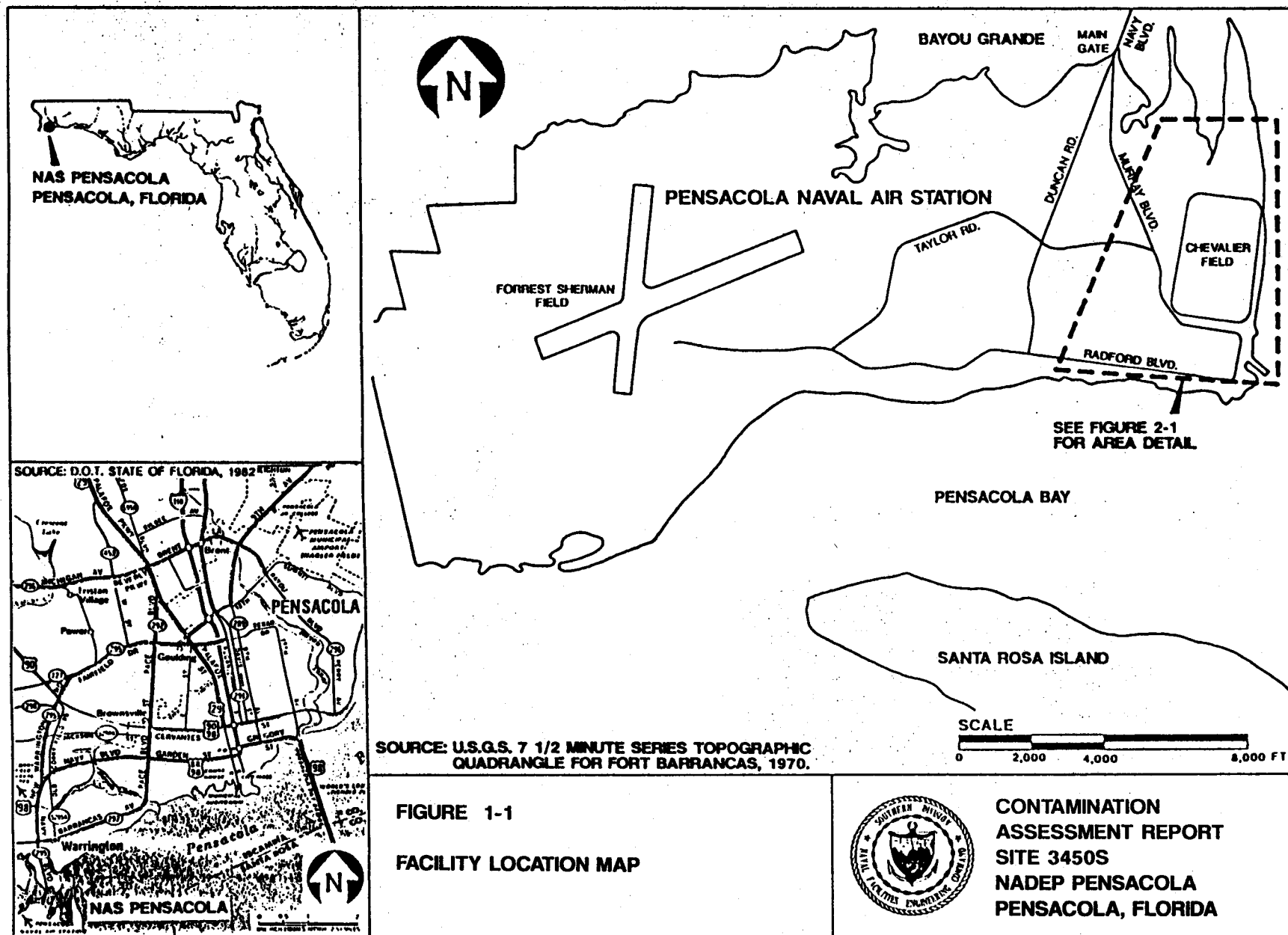
In 1987, the Naval Air Rework Facility (NARF) in Pensacola, Florida, was renamed the Naval Aviation Depot (NADEP). NADEP Pensacola, Florida, formerly the operations and repair department of the Naval Air Station (NAS) Pensacola, is now a tenant command located on NAS facilities within the Pensacola Naval Base Complex. The Pensacola Naval Base Complex is located on the western edge of Pensacola Bay on State Route 295 (Navy Boulevard; Figure 1-1). NADEP Pensacola occupies approximately 130 acres at NAS Pensacola. The mission of NADEP Pensacola is to: maintain and operate facilities for, and perform a complete range of depot-level rework operations on designated weapons systems, accessories, and equipment; manufacture parts and assemblies, as required; provide engineering services in hardware design; furnish technical services on aircraft maintenance and logistic problems; and perform other levels of aircraft maintenance.

During a tank removal program implemented by the U.S. Department of the Navy in 1989 and 1990, petroleum underground storage tanks (USTs) at various NADEP site locations were removed. In many cases, these tanks were replaced with new USTs. Tank contents were reportedly restricted to petroleum products ranging from waste oil, diesel fuel, and unleaded gasoline to PD-680 (a petroleum distillate solvent similar to mineral spirits). The reported volumes of the tanks varied from 500 to 3,000 gallons. Soil samples were collected from each tank excavation and analyzed for total recoverable petroleum hydrocarbons (TRPH). Based on TRPH concentrations, 18 sites were found to be non-compliant with Florida Department of Environmental Regulation (FDER) target levels, as defined in Chapter 17-770, Florida Administrative Code (FAC).

ABB Environmental Services, Inc. (ABB-ES), was contracted by Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform a contamination assessment (CA) and submit a Contamination Assessment Report (CAR) for the 18 petroleum contaminated sites at NADEP. This CAR is submitted for one of the sites, Site 3450S. The scope of services for the work at Site 3450S is described in Contract Task Order (CTO) No. 008, the Plan of Action (POA), and the Contamination Assessment Plan (CAP) and included the following:

- drilling soil borings and analyzing site soil samples to assess the extent of soil contamination,
- installing and sampling groundwater monitoring wells to assess the extent of groundwater contamination,
- collecting water level data to assess the groundwater flow direction and hydraulic gradient at the site,
- conducting a potable well inventory within a 0.25-mile radius of the site,
- conducting slug tests on selected wells to estimate aquifer characteristics, and





- reducing and analyzing pertinent data gathered during the CA to complete this CAR.

The CA at Site 3450S was conducted from January 1992 through January 1993. The following sections of this report present the background information, data compilation, results, conclusions, and recommendations of the CAR.

## 2.0 SITE BACKGROUND

2.1 SITE DESCRIPTION. Site 3450S is located on the south side of Building 3450, which is located several hundred feet west of the northwest portion of Chevalier Field on Farrar Road (Figure 2-1). Building 3450 is a dynamic components facility where various helicopter parts are repaired.

Site 3450S is the former location of a single 1,000-gallon UST reportedly used to store gasoline. The former UST was located on the south side of Building 3450. The former UST was removed from the site and replaced with a new UST located approximately 20 feet east of the former UST location. The new UST is reportedly used for gasoline storage.

Figure 2-2 is a site plan showing the location of the former UST, the existing UST, and surface features in the site vicinity. The former and existing UST locations are in a grassy area on the south side of Building 3450. An air conditioning unit is located between the former and existing UST locations. An asphalt road south of Building 3450 intersects Industrial Road located on the east side of the site.

2.2 SITE HISTORY. The former UST was installed in 1971 and was removed from the site during the Navy's tank removal program. The UST was replaced with the existing 1,000-gallon UST.

A composite soil sample was collected from the UST excavation and analyzed for TRPH. The reported TRPH concentration of 2,700 parts per million (ppm) exceeded the State target level of 50 ppm for petroleum contaminated soils (FDER, May 1992) and, therefore, warranted further investigation pursuant to Chapter 17-770, FAC. Soil laboratory analytical results are presented in Appendix E, Laboratory Analytical Data.

The approximate areal extent of the UST excavation and the approximate locations of the TRPH soil samples are shown in Figure 2-3. Excavated soil was returned to the excavation after UST removal.





Three 2-inch, inside diameter (ID) compliance monitoring wells (PEN-3450S-MW1 through PEN-3450S-MW3) were installed at the site after the installation of the existing UST to detect possible leakage.

During the initial field investigation performed by ABB-ES in January 1992, two soil borings (SB-1 and SB-2) and two monitoring wells (PEN-3450S-MW4 and PEN-3450S-MW-5) were placed at the site to assess the degree and extent of soil and groundwater contamination. The three existing monitoring wells were also used for assessment of groundwater contamination. Laboratory analyses of groundwater samples collected from these wells indicate that concentrations of petroleum constituents in groundwater were below State target levels; however, eight chlorinated compounds were identified in the groundwater samples. Two of these compounds, trichloroethene (TCE) and 1,1,2-trichloroethane, were detected at concentrations exceeding State recommended guidance concentrations in monitoring wells PEN-3450S-MW3 and PEN-3450S-MW5. These wells are located downgradient of the former UST location.





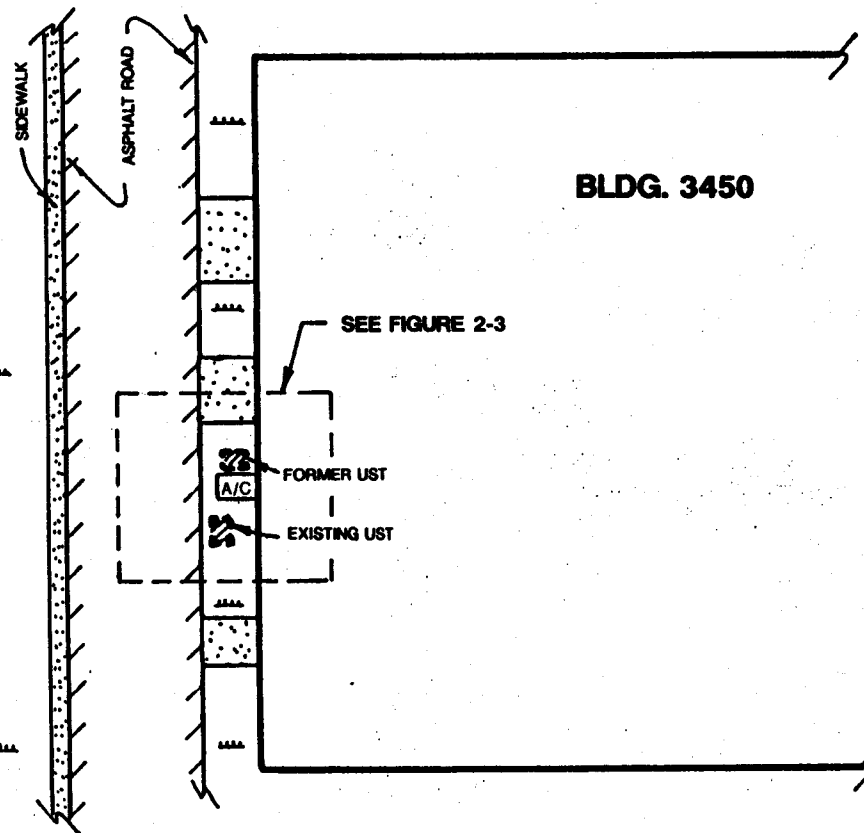
# **LEGEND**

-  CONCRETE SURFACE
-  ASPHALT SURFACE
-  GRASS
-  AIR CONDITIONING UNIT

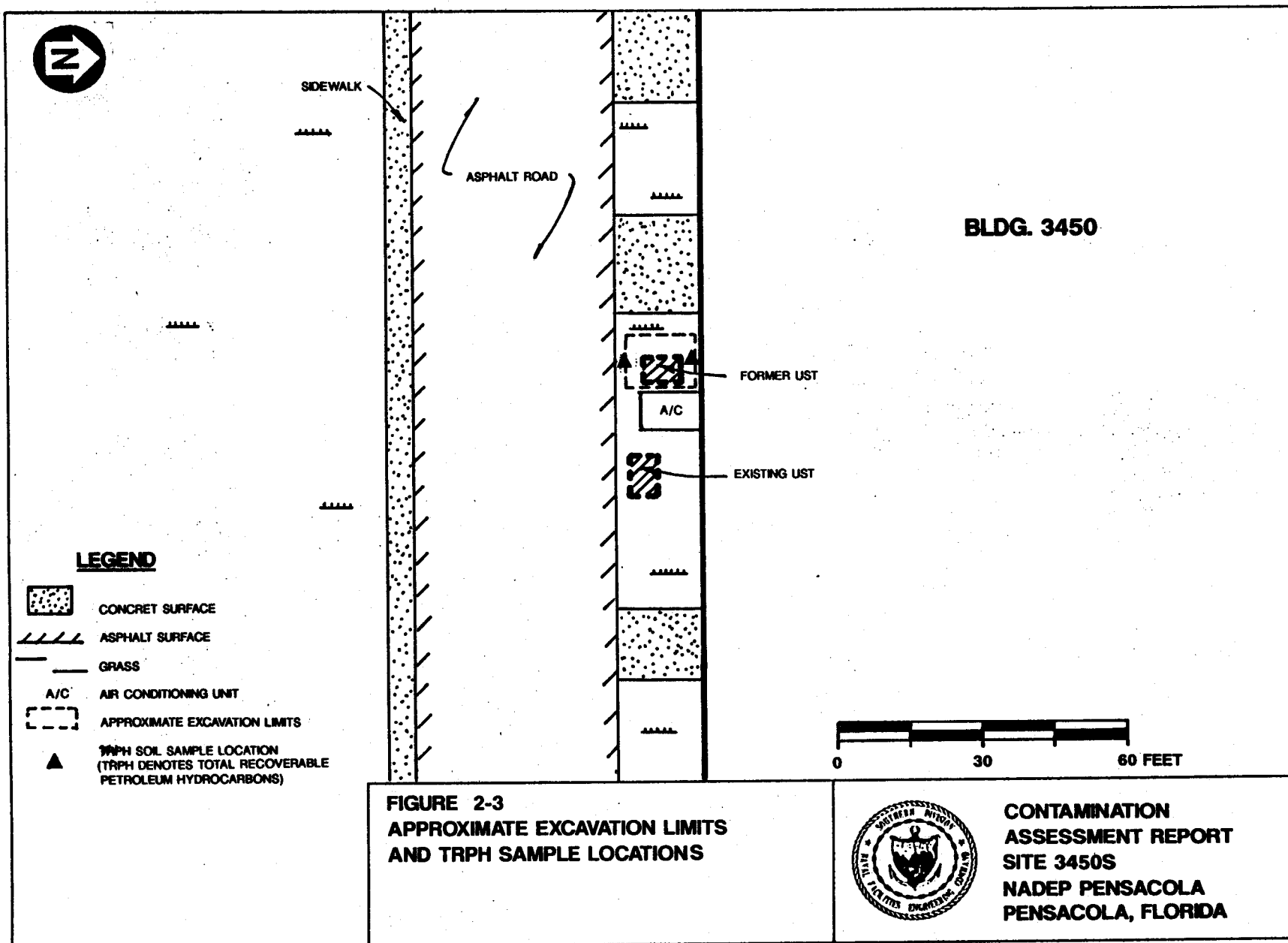
## **SCALE**



**FIGURE 2-2  
SITE PLAN**



**CONTAMINATION  
ASSESSMENT REPORT  
SITE 3450S  
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PENSACOLA, FLORIDA**



Because these compounds are not currently regulated under Chapter 17-770, FAC, guidelines, investigation at Site 3450S was held in abeyance and the FDER was notified of these findings. A meeting was held on June 17, 1992, with FDER and the U.S. Environmental Protection Agency (USEPA) to discuss the manner of future investigation at Site 3450S. Because the reported concentrations of TCE and 1,1,2-trichloroethane did not greatly exceed State recommended guidance concentrations, FDER and the USEPA agreed that additional site investigation should continue in accordance with Chapter 17-770, FAC, guidelines.

Four soil borings (SB-3 through SB-7) were drilled, and two downgradient monitoring wells (PEN-3450S-MW6 and MW7) were installed. The site investigation recommenced in August 1992. Soil borings SB-5 through SB-7 were drilled at the locations of monitoring wells PEN-3450S-MW1 through PEN-3450S-MW3. The results of the August 1992 investigation are discussed in Section 5.0 of this report.

### 3.0 SITE CONDITIONS

3.1 PHYSIOGRAPHY. Regional physiography is discussed in Appendix A, Site Conditions. Surface elevations at the site are relatively flat and are approximately 20 to 22 feet above mean sea level (msl).

#### 3.2 HYDROGEOLOGY.

3.2.1 Regional and Local The Pensacola area is underlain by three water bearing zones. These zones, in order of increasing depth, are the sand-and-gravel aquifer, the Upper Floridan aquifer, and the Lower Floridan aquifer. A detailed discussion of these three aquifers is presented in Appendix A.

3.2.2 Site specific The principal water bearing zone of concern at the site is the surficial zone of the sand-and-gravel aquifer. The surficial zone was penetrated to a depth of approximately 27 feet during this investigation. This zone is generally composed of very fine-grained to medium-grained quartz sand. The sand varies in color from white, gray, tan, light brown, and yellow-brown to reddish-brown. The surficial zone is unconfined, and the water table was encountered at depths of 16 to 19 feet below land surface (bls). Site-specific aquifer characteristics and other hydrogeologic parameters are discussed in Section 5.1.

Lithologic logs for soil borings are presented in Appendix B, Lithologic Logs.



#### 4.0 METHODOLOGIES AND EQUIPMENT

4.1 SOIL BORING AND SOIL SAMPLING PROGRAM. Seven soil borings, SB1 through SB7, were drilled at the site to assess the extent and levels of soil petroleum contamination, characterize the type of subsurface material, and aid in the subsequent placement of groundwater monitoring wells. Soil boring locations are shown in Figure 4-1. Discrete soil samples collected from split-spoon standard penetration tests (SPTs) were analyzed for petroleum constituents with an organic vapor analyzer (OVA) equipped with a flame ionization detector (FID). An additional soil sample was collected at the former UST location and analyzed for TRPH and USEPA parameters 8010 and 8020. The results of the soil boring program and soil sampling program are discussed in Section 5.2.

4.2 MONITORING WELL INSTALLATION PROGRAM. The three previously installed, 2-inch ID monitoring wells are designated PEN-3450S-MW1 through PEN-3450S-MW3. Four additional 2-inch ID monitoring wells were installed in the soil borings drilled during this investigation. These wells are designated as PEN-3450S-MW4 through PEN-3450S-MW7. Wells PEN-3450S-MW4 and PEN-3450S-MW5 were installed in January 1992; wells PEN-3450S-MW6 and PEN-3450S-MW7 were installed in August 1992. For simplicity, the prefix "PEN-3450S" has been omitted where referring to monitoring wells in figures and tables in this report. Monitoring well locations are shown in Figure 4-1. Monitoring well construction methodologies and materials are discussed in Appendix C, Investigative Methodologies and Procedures.

4.3 GROUNDWATER ELEVATION SURVEY. The elevation of the water table was measured by surveying the top of the well casing for each monitoring well to a common reference datum using a surveyor's level and stadia rod. Elevations were referenced to a benchmark located on the northeast face of Building 649, near the intersection of Murray Road and Farrar Road, approximately 900 feet west of the site (see Figure 2-1). This benchmark is part of the U.S. Coastal and Geodetic Survey benchmarking system and has an elevation of 30.20 feet above the National Geodetic Vertical Datum (NGVD) of 1929.

Groundwater levels were recorded on February 19, March 31, and August 28, 1992. Procedures for obtaining groundwater level measurements are described in Appendix C, Investigative Methodologies and Procedures.

4.4 GROUNDWATER SAMPLING PROGRAM. Groundwater samples were collected from monitoring wells PEN-3450S-MW1 through PEN-3450S-MW5 on February 6, 1992. Monitoring wells PEN-3450S-MW6 and PEN-3450S-MW7 had not been installed at that time. All seven monitoring wells were sampled on August 28, 1992. Groundwater samples from both sampling events were sent to Wadsworth/ALERT Laboratories, Tampa, Florida, for analysis. A duplicate sample, laboratory blanks, equipment blank, and a trip blank were also analyzed with the monitoring well samples. Procedures for collection of groundwater samples are presented in Appendix C, Investigative Methodologies and Procedures.

4.5 AQUIFER SLUG TESTS. Three rising head slug tests were performed in monitoring well PEN-3450S-MW2 to assess the hydraulic conductivity of the aquifer. Procedures for conducting slug tests are included in Appendix C, Investigative Methodologies and Procedures. Slug test graphical data and calculations are attached in Appendix D, Aquifer Parameter Calculations.

## 5.0 CONTAMINATION ASSESSMENT RESULTS

5.1 SITE-SPECIFIC AQUIFER CHARACTERISTICS AND HYDROGEOLOGIC PARAMETERS. The surficial zone of the sand-and-gravel aquifer is the primary interval of concern at the site. The surficial zone is unconfined, and the water table was encountered at depths ranging from 16 to 19 feet bls.

Groundwater levels were recorded in monitoring wells PEN-3450S-MW1 through PEN-3450S-MW5 on February 19 and March 31, 1992 (PEN-3450S-MW6 and PEN-3450S-MW7 were not yet installed). Groundwater levels were recorded in all seven site monitoring wells on August 28, 1992. These measurements are presented in Table 5-1 and were used to construct water table elevation contour maps to approximate the groundwater flow direction at the site. Water table elevation contour maps for February 19, March 31, and August 28, 1992, are shown in Figures 5-1 through 5-3, respectively. The data indicate an east-southeast groundwater flow direction toward Chevalier Field.

The calculated average hydraulic gradient at the site is  $8.0 \times 10^{-3}$  feet per foot (ft/ft). Slug tests indicate an average horizontal hydraulic conductivity (K) of  $3.0 \times 10^1$  feet per day (ft/day). The calculated pore water velocity (V) is  $8.0 \times 10^{-1}$  ft/day. Equations and calculations used to estimate these values are presented in Appendix D.

## 5.2 CONTAMINANT PLUME DEFINITION AND CHARACTERIZATION.





5.2.1 Soil Contamination Assessment Discrete soil samples were collected from SPT samples at depths of 5 to 7 feet bls, 10 to 12 feet bls, and 15 to 17 feet bls in soil borings SB1 through SB4. Soil samples were also collected from soil borings SB5 through SB7 at 2-foot intervals to a depth of 10 feet bls. Soil samples were analyzed using OVA headspace techniques. OVA headspace readings are presented in Table 5-2.




According to *FDER Guidelines for Assessment of Remediation of Petroleum Contaminated Sites* (May 1992), soil containing constituents of the gasoline analytical group with OVA headspace readings of less than 10 ppm is not considered to be petroleum contaminated. The highest OVA reading was 2 ppm, which indicates that gasoline soil contamination at the site is minimal. An additional soil sample was collected and analyzed for USEPA Methods 8010, 8020, and TRPH. This sample was collected from SB5, which is located at the former UST location, at a depth of 6 feet bls. Soil laboratory analyses are presented in Appendix E, Laboratory Analytical Data. A common laboratory contaminant, dichloromethane, was the only contaminant detected, at a concentration of 22 parts per billion (ppb). No other petroleum compounds were detected in this sample.

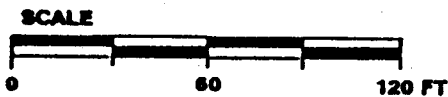
5.2.2 Groundwater Contamination Assessment In some areas in Escambia County, Florida, the surficial zone of the sand-and-gravel aquifer has been demonstrated to be hydraulically connected with the main producing zone of the sand-and-gravel aquifer, making potable water supplies susceptible to contamination in these areas (Roaza and others, 1991). For this reason, the surficial zone at NAS Pensacola will be herein treated as a Class G-II water source, and Class G-II State groundwater target levels will be applied throughout this report.



# **LEGEND**

-  CONCRETE SURFACE
-  ASPHALT SURFACE
-  GRASS
-  MONITORING WELL LOCATION
- (2.32)

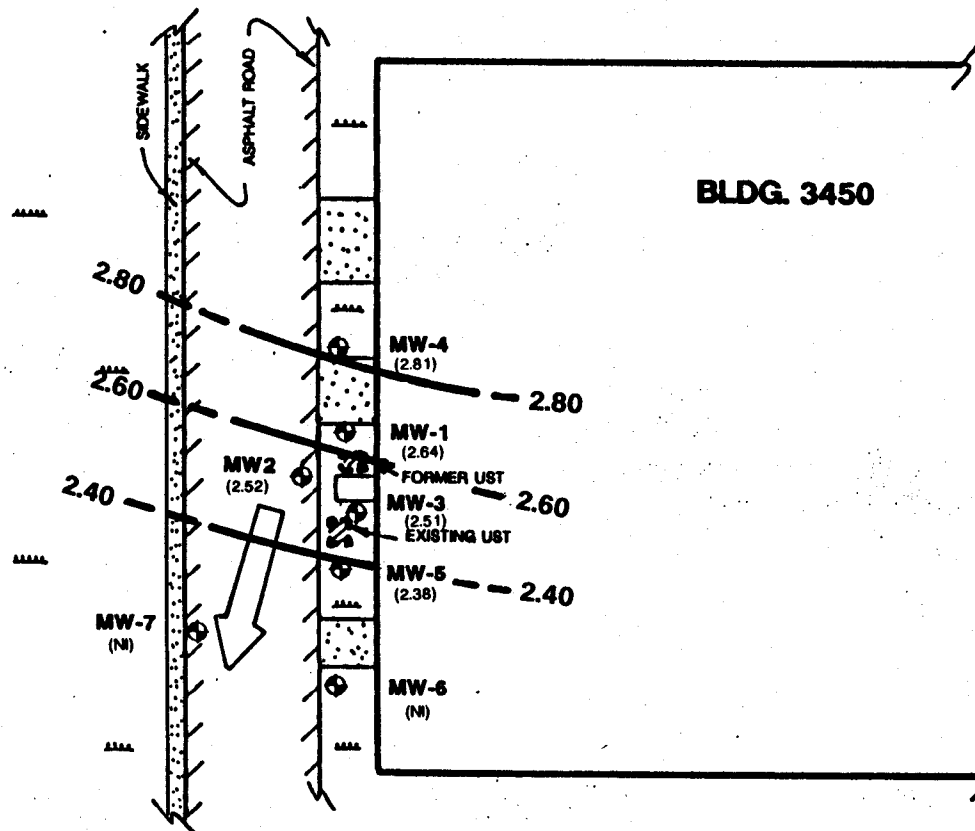
 WATER TABLE ELEVATION (FEET)  
(NI DENOTES WELL NOT INSTALLED AT TIME OF WATER TABLE MEASUREMENT)
-  EQUIPOTENTIAL LINE (FEET)  
CONTOUR INTERVAL = 0.20 FEET  
(DASHED DENOTES INFERRED)
-  GROUNDWATER FLOW DIRECTION



**FIGURE 5-1**  
**WATER TABLE ELEVATION CONTOUR MAP,**  
**SURFICIAL ZONE,**  
**SAND-AND-GRAVEL AQUIFER,**  
**FEBRUARY 19, 1992**








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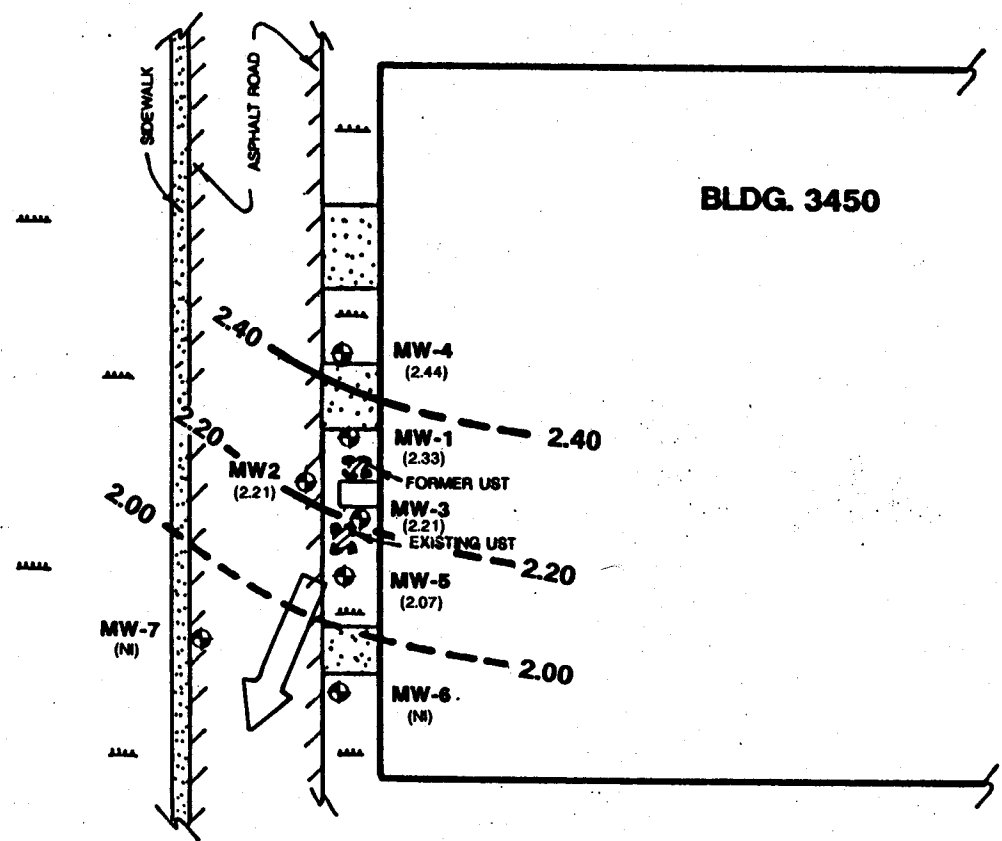
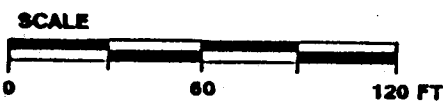


**LEGEND**

-  CONCRETE SURFACE
-  ASPHALT SURFACE
-  GRASS
-  MONITORING WELL LOCATION
- (2.33) WATER TABLE ELEVATION (FEET)  
(NI DENOTES WELL NOT INSTALLED AT TIME OF WATER TABLE MEASUREMENT)

 EQUIPOTENTIAL LINE (FEET)  
CONTOUR INTERVAL = 0.20 FEET  
(DASHED DENOTES INFERRED)

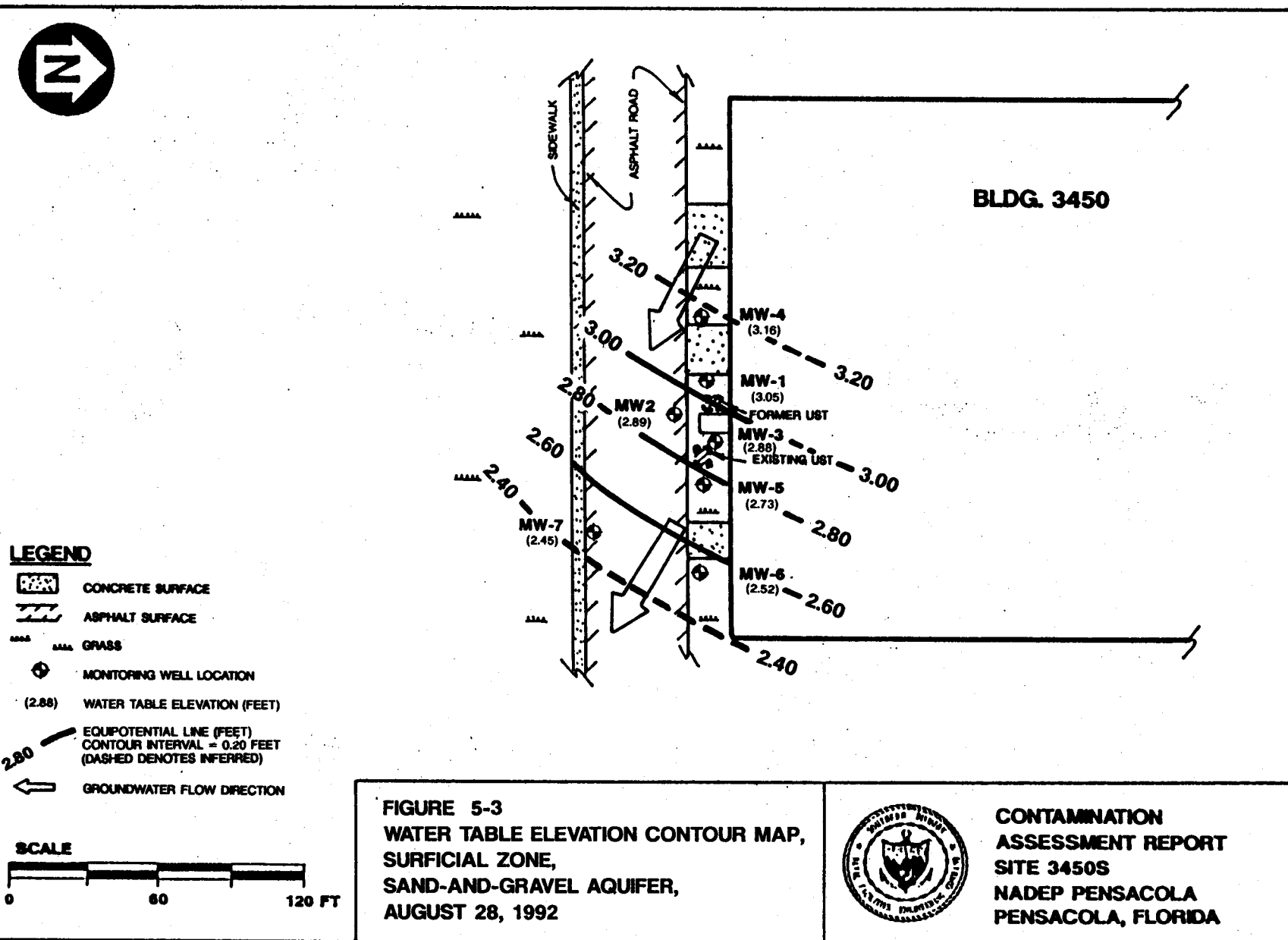
 GROUNDWATER FLOW DIRECTION



**FIGURE 5-2**  
**WATER TABLE ELEVATION CONTOUR MAP,**  
**SURFICIAL ZONE,**  
**SAND-AND-GRAVEL AQUIFER,**  
**MARCH 31, 1992**



**CONTAMINATION**  
**ASSESSMENT REPORT**  
**SITE 3450S**  
**NADEP PENSACOLA**  
**PENSACOLA, FLORIDA**



**FIGURE 5-3**  
**WATER TABLE ELEVATION CONTOUR MAP,**  
**SURFICIAL ZONE,**  
**SAND-AND-GRAVEL AQUIFER,**  
**AUGUST 28, 1992**



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ASSESSMENT REPORT  
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PENSACOLA, FLORIDA**

**Table 5-2**  
**Summary of Soil Sample Organic Vapor Analyzer (OVA) Headspace Analyses,**  
**January through December 1992**

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Boring Designation	Depth (feet)	Concentration <sup>1</sup> (ppm)	Comments
SB1/MW4	4-6	0	No odor and no discoloration
	10-12	0	No odor and no discoloration
	15-17	0	No odor and no discoloration
SB2/MW5	4-5	0	No odor and no discoloration
	5-7	1	No odor and no discoloration
	10-12	2	No odor and no discoloration
	15-17	1	No odor and no discoloration
SB3/MW6	5	0	No odor and no discoloration
	10-12	0	No odor and no discoloration
	15-17	0	No odor and no discoloration
SB4/MW7	5	0	No odor and no discoloration
	10-12	0	No odor and no discoloration
	15-17	0	No odor and no discoloration
SB5	2	0	No odor and no discoloration
	4	0	No odor and no discoloration
	6	0	No odor and no discoloration
	8	0	No odor and no discoloration
	10	0	No odor and no discoloration
SB6	2	0	No odor and no discoloration
	4	0	No odor and no discoloration
	6	0	No odor and no discoloration
SB7	2	0	No odor and no discoloration
	4	1	No odor and no discoloration
	5-7	0	No odor and no discoloration
	10-12	1	No odor and no discoloration

<sup>1</sup>Corrected for methane.

Note: ppm = parts per million.

Groundwater samples were collected from site monitoring wells PEN-3450S-MW1 through PEN-3450S-MW4 on January 26, 1992, and from monitoring well PEN-3450S-MW5 on February 5, 1992. Monitoring wells PEN-3450S-MW1 through PEN-3450S-MW5 and two additional downgradient wells, PEN-3450S-MW6 and PEN-3450S-MW7, were sampled on August 28, 1992. Samples were submitted to Wadsworth/ALERT Laboratories in Tampa, Florida, for analyses of volatile organic compounds (VOC) and lead. Groundwater sample laboratory analytical results are presented in Appendix E, Laboratory Analytical Data. Groundwater analytical laboratory results for the January 26 and February 5, 1992, sampling events and the August 28, 1992, sampling event are summarized in Tables 5-3 and 5-4, respectively.

**5.2.2.1 Groundwater Laboratory Analytical Results, January 26 and February 6, 1992, Sampling Events** Figure 5-4 shows the distribution of contaminants detected in groundwater samples collected from monitoring wells PEN-3450S-MW1 through PEN-3450S-MW5 on January 26 and February 6, 1992. Unleaded gasoline constituents identified in groundwater samples were toluene, methyl tert-butyl ether (MTBE), and lead. Other compounds identified were 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethene (total), 1,2-dichloropropane, 1,1,1-trichloroethane, trichloroethene (TCE), and trichlorofluoromethane.

Toluene was detected in only the sample collected from well PEN-3450S-MW2, at a concentration of 10 ppb. Toluene was also detected in the trip blanks associated with this sampling event, at concentrations of 2 and 21 ppb. Wadsworth/ALERT Laboratories reported that the sample container labels used to identify groundwater samples were contaminated with toluene. Wadsworth/ALERT reports that this contamination has resulted in the random appearance of toluene in samples, trip blanks, and equipment blanks at concentrations ranging from 2 ppb to 22 ppb. It appears that the source of toluene contamination in the sample collected from well PEN-3450S-MW2 is from the sample label.

MTBE was detected in only the sample collected from well PEN-3450S-MW1 at a concentration of 2 ppb. This is well below the State target level of 50 ppb defined in FDER, Chapter 17-770, FAC.

Lead was detected in only the unfiltered sample collected from monitoring well PEN-3450S-MW5 at a concentration of 25 ppb. This concentration is below the State target level for lead of 50 ppb.

TCE was the only compound detected in concentrations exceeding State recommended guidance concentrations (FDER, February 1991). The State recommended guidance concentration for TCE is 3 ppb. TCE was detected in samples collected from monitoring wells PEN-3450S-MW1, PEN-3450S-MW3, and PEN-3450S-MW5 at concentrations of 2 ppb, 8 ppb, and 7 ppb, respectively. TCE was not detected in the samples collected from monitoring wells PEN-3450S-MW2 and PEN-3450S-MW4. At the time of sampling, monitoring wells PEN-3450S-MW3 and PEN-3450S-MW5 were the two most-downgradient wells at the site. For reasons discussed in Section 2.0, site investigation was halted until August 1992.

**5.2.2.2 Groundwater Laboratory Analytical Results August 28, 1992, Sampling Event** Figure 5-5 is a groundwater contamination map showing the distribution of contaminants detected in groundwater samples collected at the site on August 28, 1992.

**Table 5-3**  
**Summary of Groundwater Sample Laboratory Analyses,**  
**January 26 and February 6, 1992**

Contamination Assessment Report  
 Site 3450S, Naval Aviation Depot  
 Pensacola, Florida

Compound	State Target Level or Guidance Concentration	MW1	MW2	MW3	MW4	MW4 Duplicate	MW5	Equipment Blank 1	Equipment Blank 2	Trip Blank	Lab Blank
Toluene	<sup>1</sup> 50	ND	10	ND	ND	ND	ND	ND	ND	21	ND
Total VOA	<sup>1</sup> 50	ND	10	ND	ND	ND	ND	ND	ND	21	ND
Methyl tert-butyl ether	<sup>1</sup> 50	2	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead	<sup>1</sup> 50	ND	ND	ND	ND	ND	<sup>3</sup> 25	ND	ND	ND	ND
1,1-Dichloroethane	<sup>2</sup> 2,400	62	ND	110	2	3	79	ND	ND	ND	ND
1,1-Dichloroethene	<sup>2</sup> 7	3	ND	1	ND	ND	4	ND	ND	ND	ND
1,2-Dichloroethene (total)	<sup>2</sup> 4.2	ND	ND	4	ND	ND	4	ND	ND	ND	ND
1,2-Dichloropropane	<sup>2</sup> 1	ND	ND	1	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	<sup>2</sup> 200	7	ND	2	ND	ND	7	ND	ND	ND	ND
Trichloroethene	<sup>2</sup> 3	2	ND	8	ND	ND	7	ND	ND	ND	ND
Trichlorofluoromethane	<sup>2</sup> 2,400	ND	ND	36	ND	ND	24	ND	ND	ND	ND

<sup>1</sup>State target level (Florida Department of Environmental Regulation [FDER], Chapter 17-770, Florida Administrative Code [FAC]).

<sup>2</sup>Guidance concentration recommended by FDER (February 1989).

<sup>3</sup>Unfiltered sample.

Notes: Samples collected from MW1 through MW4 on January 26, 1992.

Samples collected from MW5 on February 5, 1992.

Concentrations are in parts per billion (ppb).

Duplicate sample was collected from monitoring well MW4.

Total VOA = total volatile organic aromatics; the sum of benzene, ethyl benzene, toluene, and xylenes.

ND = not detected.



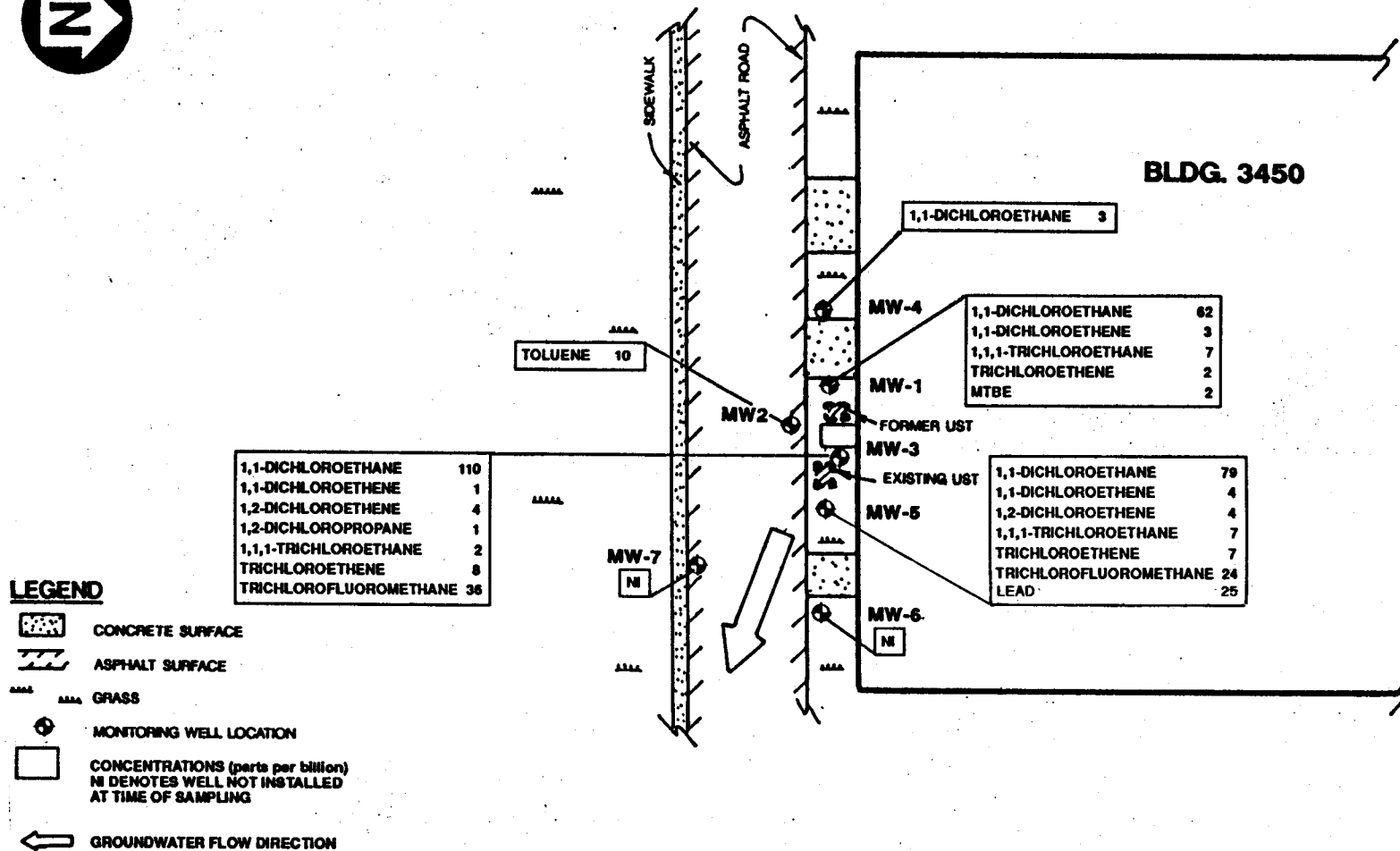
**Contamination Assessment Report  
Site 3450S, Naval Aviation Depot  
Pensacola, Florida**

Compound	State Target Level or Guidance Concentration	MW1	MW2	MW3	MW4	Duplicate MW4	MW5	MW6	MW7	Equipment Blank	Trip Blank	Laboratory Blank
Methyl tert-butyl ether	<sup>1</sup> 50	ND	ND	ND	ND	ND	ND	1	ND	ND	ND	ND
1,1-Dichloroethane	<sup>2</sup> 2,400	24	1	33	8	7	14	8	6	ND	ND	ND
1,1,1-Trichloroethane	<sup>2</sup> 200	3	4	ND	2	2	4	5	1	ND	ND	ND
Trichloroethene	<sup>2</sup> 3	1	ND	4	2	1	1	1	ND	ND	ND	ND
Trichlorofluoromethane	<sup>2</sup> 2,400	2	ND	11	ND	ND	4	1	ND	ND	ND	ND
Chloroform	<sup>2</sup> 100	ND	1	ND	1	ND	ND	ND	ND	ND	ND	ND
Chloromethane	<sup>2</sup> 3,800	ND	ND	2	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	<sup>2</sup> 5	ND	ND	2	ND	ND	ND	ND	ND	ND	1	ND
1,1,2-Trichloroethane	<sup>2</sup> 1	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	ND

<sup>1</sup>State target level (Florida Department of Environmental Regulation [FDER], Chapter 17-770, Florida Administrative Code [FAC]).

<sup>2</sup>Recommended guidance concentration (FDER, February 1989).

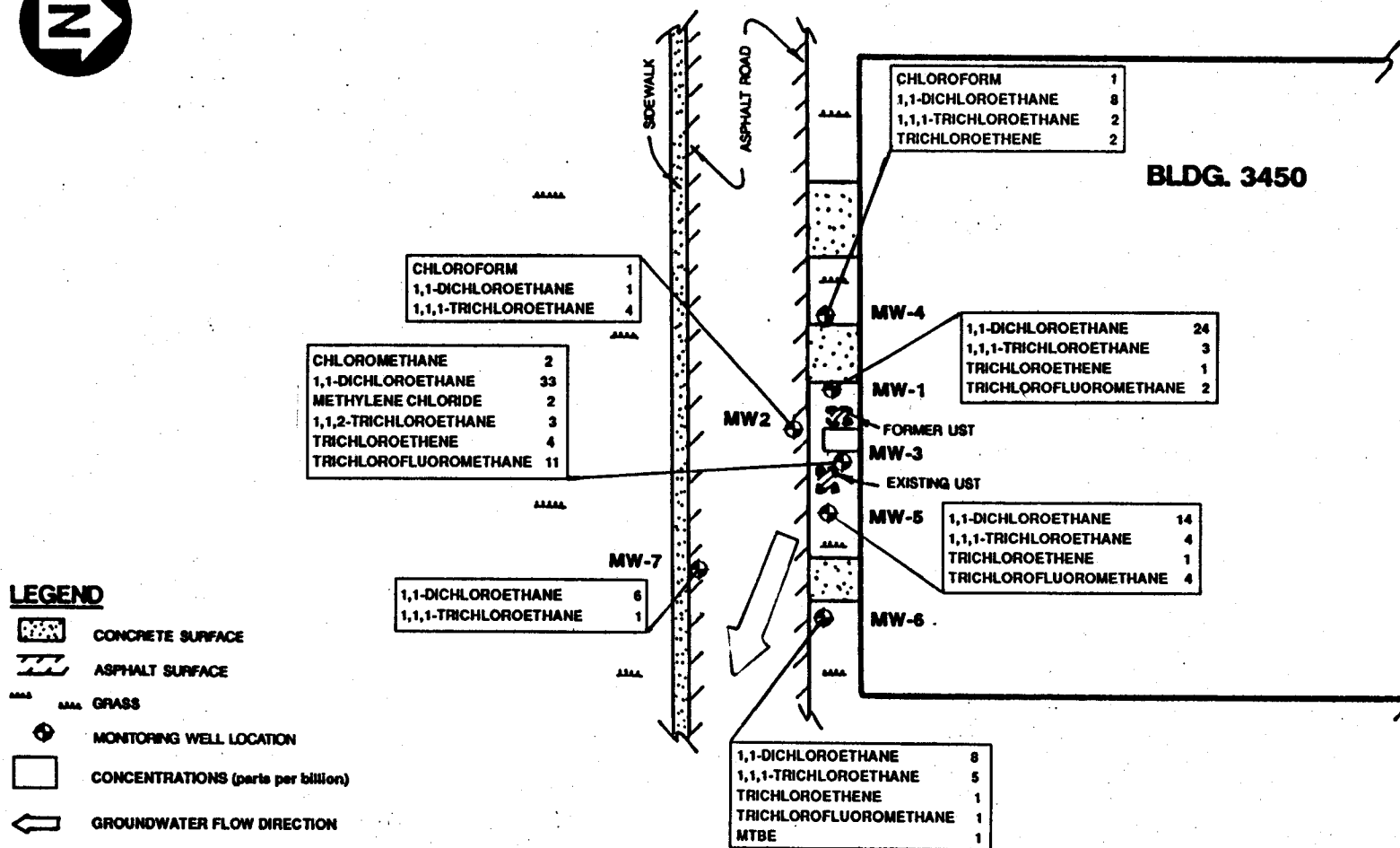
Notes: Concentrations are in parts per billion (ppb).  
ND = not detected.



**FIGURE 5-4**  
**GROUNDWATER CONTAMINATION**  
**DISTRIBUTION MAP,**  
**JANUARY 26 THROUGH**  
**FEBRUARY 5, 1992**



**CONTAMINATION**  
**ASSESSMENT REPORT**  
**SITE 3450S**  
**NADEP PENSACOLA**  
**PENSACOLA, FLORIDA**



**FIGURE 5-5**  
**GROUNDWATER CONTAMINATION**  
**DISTRIBUTION MAP,**  
**AUGUST 28, 1992**



**CONTAMINATION**  
**ASSESSMENT REPORT**  
**SITE 3450S**  
**NADEP PENSACOLA**  
**PENSACOLA, FLORIDA**

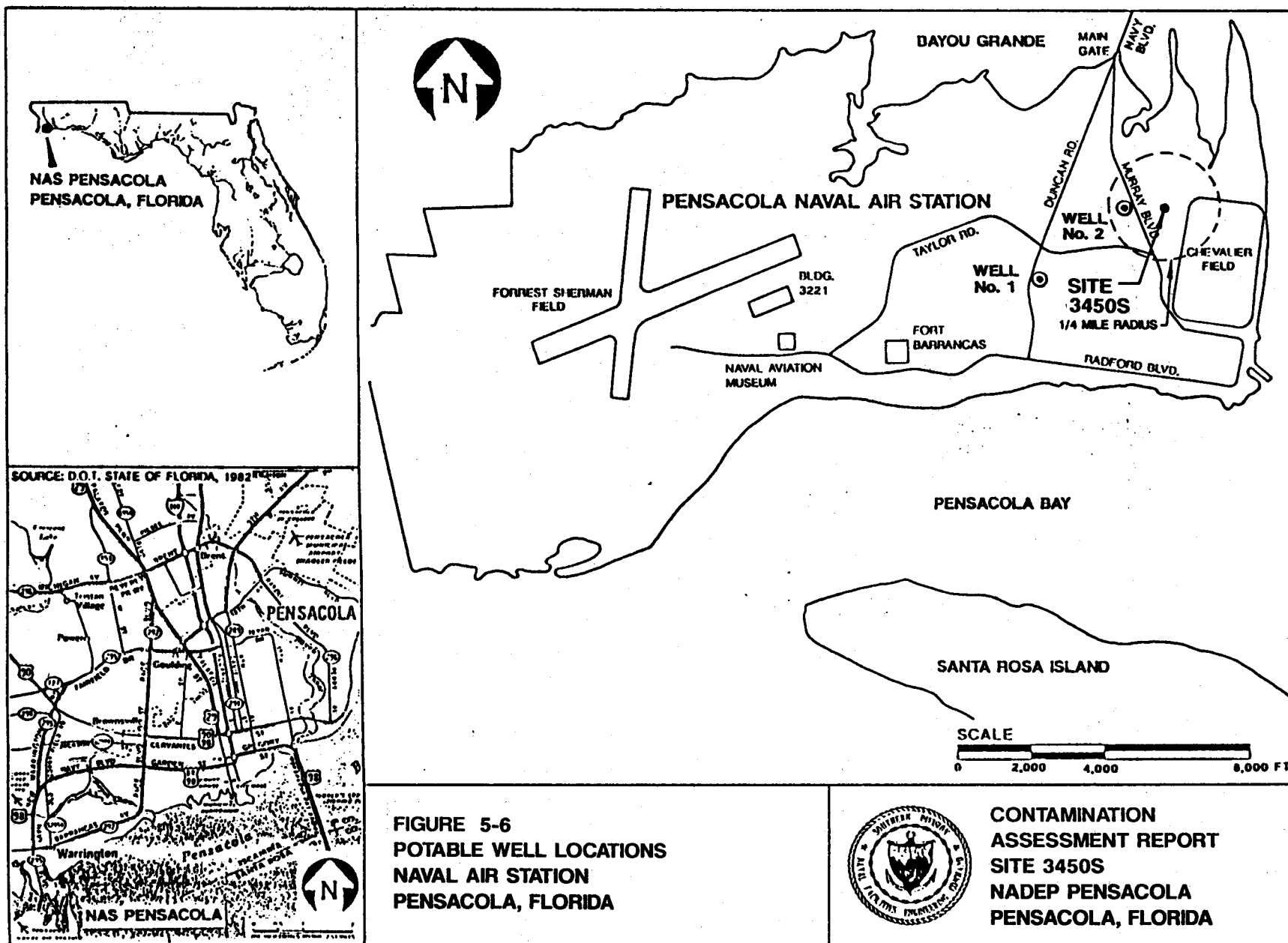
MTBE was the only unleaded gasoline constituent detected in groundwater samples. MTBE was detected in only the sample collected from monitoring well PEN-3450S-MW6, at a concentration of 1 ppb. Because the State target level for MTBE is 50 ppb and because MTBE was detected in only one sample, MTBE does not appear to be a contaminant of concern at the site.

Other compounds detected in samples collected from monitoring wells include 1,1-dichloroethane, 1,1,1-trichloroethane, TCE, trichlorofluoromethane, chloroform, chloromethane, methylene chloride, and 1,1,2-trichloroethane. Methylene chloride and chloroform are common laboratory contaminants, and the low concentrations detected in groundwater samples may be the result of laboratory analytical processes. Trichlorofluoromethane is commonly associated with cooling units and its presence may be associated with the air-conditioning unit located between the existing UST and former UST location.

TCE and 1,1,2-trichloroethane were the only contaminants detected in concentrations exceeding State recommended guidance concentrations, and only in the sample collected from monitoring well PEN-3450S-MW3. The reported TCE and 1,1,2-trichloroethane concentrations of 4 ppb and 3 ppb, respectively, exceed the State recommended guidance concentrations for TCE and 1,1,2-trichloroethane of 3 ppb and 1 ppb, respectively. TCE and 1,1,2-trichloroethane were not detected in the downgradient wells, PEN-3450S-MW6 and PEN-3450S-MW7. The source of this contamination is presently unknown. Because these compounds are not constituents of unleaded gasoline (FDER, May 1989), it does not appear that the unleaded gasoline UST at the site is the source of this contamination.

**5.3 POTABLE WELL SURVEY.** A potable well survey was conducted to assess the risk of contamination to potable water sources from activities at Site 3450S. Two potable supply wells (designated as Well No. 1 and Well No 2 in Figure 5-6) were identified at NAS Pensacola (Wilkins and others, 1985). The NAS Pensacola water supply system is used in conjunction with the Corry Field water supply system, which is located approximately 2 miles north of NAS Pensacola. According to NADEP personnel, these wells are not currently used for potable water supply at NAS Pensacola, but are available as reserve potable water supplies should the need arise.

Potable well inventory data are presented in Table 5-5. Both wells at NAS Pensacola are screened in the main producing zone of the sand-and-gravel aquifer at depths ranging from 105 to 160 feet bls. Well No. 2 is located within a 0.25-mile radius of the site and is upgradient to the site. The possibility of contamination of potable water sources from normal activities at Site 3450S does not appear likely.



**Table 5-5  
Potable Well Inventory Data,  
Naval Air Station, Pensacola Florida**

Contamination Assessment Report  
Site 3450S, Naval Aviation Depot  
Pensacola, Florida

Well Identification Number/Local Name	Location	Total Depth (feet bls)	Screened Interval (feet bls)	Diameter Casing/Screen (inches)
302116087170201/No. 1	Sec. 1,T3S,R30W Duncan and Taylor Roads	174	105-160	24/12
302124087163601/No. 2	Sec. 1,T3S,R30W Murray and Farrar Roads	178	110-160	24/12
Note: bls = below land surface.				

## 6.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

**6.1 SUMMARY.** Based on the results of field data and laboratory analytical results collected during this CA, the following is a summary of conditions at the site.

- The sediments encountered during drilling operations are predominantly comprised of very fine-grained to medium-grained quartz sand. These sediments are part of the surficial zone of the sand-and-gravel aquifer (Roaza and others, 1991).
- Groundwater beneath the site was encountered at depths ranging from approximately 16 to 19 feet bls and is classified as G-II.
- The direction of groundwater flow in the surficial zone is to the east-southeast.
- The calculated average hydraulic gradient across the site is  $8.0 \times 10^{-3}$  ft/ft.
- The calculated average hydraulic conductivity at the site is  $3.0 \times 10^1$  ft/day.
- The calculated average pore water velocity is  $8.0 \times 10^{-1}$  ft/day.
- OVA headspace analyses of soil indicate that soil gasoline contamination is minimal. Laboratory analysis of a soil sample collected at the former UST location also indicates that soil gasoline contamination is minimal.
- Laboratory analyses of groundwater samples from the most recent sampling event of August 28, 1992, indicate that TCE and 1,1,2-trichloroethane are the only contaminants present in concentrations exceeding State target levels or recommended guidance concentrations. Concentrations of these two compounds exceeded recommended guidance concentrations in only the sample collected from monitoring well PEN-3450S-MW3. These compounds were not detected in the farthest wells downgradient of the site. The source of TCE and 1,1,2-trichloroethane was not identified during this investigation.
- One potable water well was identified within a 0.25-mile radius of the site. This well is upgradient of the site.

**6.2 CONCLUSIONS.** The level of gasoline contamination in soil and groundwater at the site appears to be minimal. No gasoline-contaminated soil samples were identified by OVA headspace analysis or TRPH analysis. The only groundwater contaminants exceeding State target levels or recommended guidance concentrations from the latest sampling event are TCE and 1,1,2-trichloroethane. The source of these compounds is presently unknown. Because these compounds are not constituents of unleaded gasoline (FDER, May 1989), the source of these contaminants does not appear to be from the UST. TCE and 1,1,2-trichloroethane were not detected in the samples collected from the wells farthest downgradient of the site. Concentrations of these compounds were either not detected or below State recommended guidance concentrations in samples collected from other site monitoring wells. Therefore, the area of concern appears to be restricted to a small area in the vicinity of monitoring well PEN-3450S-MW3. Contamination does not appear to be migrating from the site, and groundwater contamination found at Site 3450S is not expected to affect local potable water supplies on the base.

**6.3 RECOMMENDATIONS.** Based on the findings and conclusions discussed above, a *No Further Action Plan (NFAP)* is recommended for the unleaded gasoline UST at the site. Because TCE and 1,1,2-trichloroethane were detected in the groundwater at *diminimus* concentrations, it is recommended that this contamination be monitored for a period of one year. It is recommended that groundwater monitoring involve the quarterly sampling of all site monitoring wells. Groundwater samples should be analyzed for USEPA Method 601. Because TCE and 1,1,2-trichloroethane are not constituents of unleaded gasoline, further investigation at the site, if deemed by the State to be necessary, should not be performed under Chapter 17-770, FAC, guidelines.



## 7.0 PROFESSIONAL REVIEW CERTIFICATION

The contamination assessment contained in this report was prepared using sound, hydrogeologic principles and judgment. This assessment is based on the geologic investigation and associated information detailed in the text and appended to this report. If conditions are determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of any additional information on the assessment described in this report. This Contamination Assessment Report was developed for the UST located at Site 3450S at the Naval Aviation Depot, Naval Air Station, Pensacola, Florida, and should not be construed to apply to any other site.

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Roger Durham  
Professional Geologist  
P.G. No. 001127

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Date

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**APPENDIX A**  
**SITE CONDITIONS**

## Regional and Local Physiography

Florida is divided into four physiographic zones; the Coastal Lowlands, the Central Highlands, the Northern Highlands, and the Marianna Lowlands (Puri and Vernon, 1964). The Pensacola area lies entirely within the Coastal Lowlands zone, which closely parallels the Florida coastline. The Coastal Lowlands are further divided into the Atlantic, Distal, and Gulf Coastal Lowlands (Puri and Vernon, 1964). The Naval Aviation Depot (NADEP) Pensacola is located within the Gulf Coastal Lowlands. The lowlands are characterized by poor drainage and elevations less than 100 feet above mean sea level. Landforms include barrier islands, estuaries, coastal ridges, dunes, and valleys (Puri and Vernon, 1964).

Land surface altitudes at NADEP Pensacola range from sea level at the coast to greater than 30 feet above mean sea level. Surface drainage is variable, but is generally toward the nearest body of water.

## Regional Hydrogeology

NADEP Pensacola is underlain by three water bearing zones. These zones include the sand-and-gravel aquifer, the Upper Floridan aquifer, and the Lower Floridan aquifer.

The sand-and-gravel aquifer is comprised of Pleistocene terrace deposits, the Pliocene Citronelle Formation (Marsh, 1966), and Miocene coarse clastics. These deposits extend from the surface to a depth of approximately 400 feet below land surface (bls) and are predominantly poorly sorted, fine-grained to coarse-grained sand interbedded with numerous layers of clay and gravel (up to 60 feet thick). There is great lithologic variability in these deposits. Clay lenses and the presence of hardpan layers within the sand-and-gravel aquifer result in the occurrence of perched water tables and artesian conditions in some areas (Musgrove and others, 1965). Groundwater flow is generally topographically controlled. Recharge to the aquifer is derived almost entirely from local rainfall. The sand-and-gravel aquifer is the sole source of potable groundwater in the Pensacola area (Roaza and others, 1991).

The sand-and-gravel aquifer is divided into three major zones: the surficial zone, the low permeability zone, and the main producing zone (Roaza and others, 1991). These designations are based on changes in permeability of the sediments comprising each zone. The surficial zone is the uppermost layer of the aquifer. It consists primarily of sand and gravel with occasional silt and clay deposits. This zone ranges in thickness from 0 to 150 feet (Roaza and others, 1991). The low permeability zone, which underlies the surficial zone, consists of various mixtures of clay, silt, sand, and gravel. Locally, this zone contains poorly sorted sand, with gravel and some clay (Roaza and others, 1991). The thickness of the zone varies from 50 to 100 feet. Individual beds of the low permeability zone are highly discontinuous, and in some areas there may be hydraulic connection between the surficial zone and the main producing zone. The main producing zone is composed of moderate to well sorted sand-and-gravel beds that are typically interbedded with beds of fine-grained sand and clay. Locally, this zone typically contains medium-grained sand and sandy clays (Roaza and others, 1991). The thickness of the main producing zone ranges from 200 to 300 feet.

The Upper Floridan aquifer is comprised of deposits correlative to the lower Miocene Tampa Formation and the upper Oligocene Chickasawhay Formation. These two

formations are undifferentiated in the Pensacola area. Locally, these deposits are approximately 380 feet thick (Marsh, 1966) and are typically brown to light gray, hard, fossiliferous dolomitic limestone or dolomite with a distinctive spongy-looking texture. Locally, the overlying Pensacola Clay is approximately 1,000 feet thick and forms an effective confining unit between the sand-and-gravel aquifer and the Upper Floridan aquifer (Marsh, 1966). This confining unit has also been designated as part of the Intermediate System (Roaza and others, 1991). The Upper Floridan aquifer is recharged by local rainfall in Conecuh, Escambia, and Monroe Counties, Alabama (Healy, 1980). General groundwater flow in the Upper Floridan aquifer is to the southeast toward the Gulf of Mexico (Barr, 1987). The groundwater in the Upper Floridan aquifer is mineralized in the Pensacola area and is not used as a water supply.

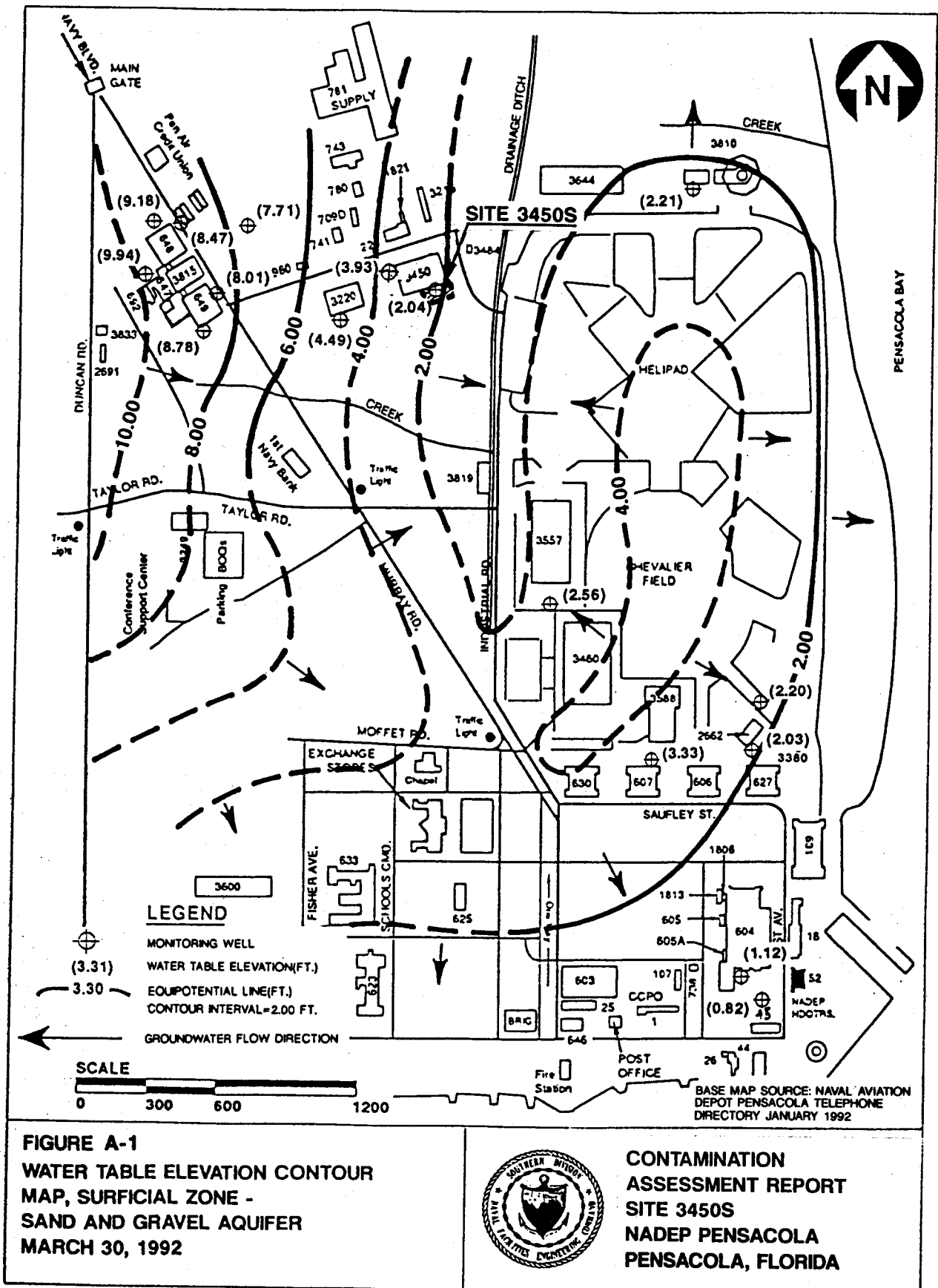
The Lower Floridan aquifer is comprised of upper to middle Eocene limestones. The aquifer is approximately 500 feet thick in the vicinity (Marsh, 1966). The limestones are typically white to grayish cream, soft, and chalky. The Lower Floridan aquifer is confined from above by the Bucatunna Clay Member of the middle Oligocene Byram Formation and from below by gray shales and clays of middle Eocene age. The Bucatunna Clay, also called the Intermediate Zone, is approximately 170 feet thick in the Pensacola area (Musgrove and others, 1965). Groundwater flow in the aquifer is to the southeast toward the Gulf of Mexico (Healy, 1980). The water quality is poor because of high mineralization.

#### Local Hydrogeology

The surficial zone of the sand-and-gravel aquifer is the interval of primary concern at NAS Pensacola. The surficial zone extends from the surface to a depth of approximately 100 feet bls (Roaza and others, 1991). Soils from 0 to 50 feet bls encountered in investigations performed by ABB-ES at the NADEP facility are generally composed of fine-grained to very fine-grained sand, with very little silt and clay. Occasional coarse-grained sand to fine-grained gravel were encountered, and thin peat layers were found at NAS Pensacola in the Forrest Sherman Field vicinity.

Groundwater in the surficial zone is non-artesian and is encountered at depths ranging from less than 2 feet bls to greater than 20 feet bls at the NADEP facility. The depth to groundwater is mainly controlled by topography. Recharge is predominantly from local rainfall.

Figure A-1 shows the groundwater flow direction in the site vicinity on March 30, 1992, based on NADEP-wide measurements. The direction of groundwater flow in the site vicinity is predominantly to the east, although variations in topography and the presence of surface water bodies result in localized changes in the groundwater flow direction. For example, groundwater flow is northerly at the north end of Chevalier Field and appears to be influenced by a tidal creek north of Building 3810. A southerly flow toward Pensacola Bay is indicated along Radford Boulevard in the southwest area shown on Figure A-1. A westerly flow was observed near the 3557 Building area on the west edge of Chevalier Field toward a drainage ditch along the west side of Industrial Road. The reversal of the predominantly eastern flow near Building 3557 results in an apparent piezometric "high" in the central part of Chevalier Field.



Perched water tables were observed in the Forrest Sherman Field area, approximately 2 miles west of the site. Perched water tables are apparently the result of lower permeability peat layers found in this area. Perched water tables were not observed in the vicinity of Site 3450S.

Locally, hydraulic gradients in the surficial zone vary from approximately  $1 \times 10^{-3}$  feet per foot (ft/ft) to  $7 \times 10^{-3}$  ft/ft. Gradients are generally less in the lower flat-lying areas than in the topographically higher areas to the northwest of Chevalier Field. Additional water level measurements, taken on numerous occasions at low-elevation sites located near Pensacola Bay, indicate tidal fluctuations do not appear to alter the groundwater flow direction and do not appear to have a great effect on hydraulic gradients at NAS Pensacola.



**APPENDIX B**  
**LITHOLOGIC LOGS**

TITLE: NADEP Pensacola			LOG of WELL: PEN-3450S-MW4		BORING NO. SB1	
CLIENT: SOUTHNAVFACENGCOM					PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc.			DATE STARTED: 1/23/92		COMPLTD: 1/23/92	
METHOD: 4.25" HSA		CASE SIZE: 2 inches		SCREEN INT.: 14.6-24.6'		PROTECTION LEVEL: D
TOC ELEV.: 21.17 FT.		MONITOR INST.: OVA		TOT DPTH: 24.62FT.		DPTH TO $\nabla$ 18.01 FT.
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/23/92			SITE: 3450S	

DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5		18/24		0	SAND: yellow-brown to reddish brown, very fine- to fine-grained, some silt and clay.		SM	2,2,4,5	
10		12/24		0				4,8,17,19	
15		12/24		0	SAND: light tan, very fine- to fine-grained, orange brown sand laminae, throughout, sample is warm (steam line in vicinity).		SP	15,25,30,40	
20		13/24		-	SAND: light brown to white, very fine- to fine-grained, wet, warm.			10,18,26,30	
25		21/24		-	SAND: very light brown-grey to off-white, very fine- to fine-grained, wet, warm.			13,19,21,27	

TITLE: NADEP Pensacola			LOG of WELL: PEN-3450S-MW5		BORING NO. SB2	
CLIENT: SOUTHNAVFACENGCOM					PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc.			DATE STARTED: 2/5/92		COMPLTD: 2/5/92	
METHOD: 4.25" HSA		CASE SIZE: 2 inches		SCREEN INT.: 15.3-25.3'		PROTECTION LEVEL: D
TOC ELEV.: 20.67 FT.		MONITOR INST.: OVA		TOT DPTH: 25.28FT.		DPTH TO $\nabla$ 17.94 FT.
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 2/5/92			SITE: 3450S	

DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5		24/24	1	SAND: Orange-brown, very fine- to fine-grain, some silt, some clay.		SP	2,3,4,5	
10		17/24	2	SAND: Light orange-brown to tan, very fine- to fine grain.		4,3,8,16		
15		20/24	1			4,9,15,15		
20		21/24	-	SAND: Light brown to tan, very fine- to fine-grain, wet.		5,14,27,15		
25								

TITLE: NADEP Pensacola		LOG of WELL: PEN-3450S-MW6		BORING NO. SB3	
CLIENT: SOUTHNAVFACENGCOM				PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc.			DATE STARTED: 8/25/92		COMPLTD: 8/25/92
METHOD: 4.25" HSA		CASE SIZE: 2 inches	SCREEN INT.: 14.9-24.9'	PROTECTION LEVEL: D	
TOC ELEV.: 20.14 FT.		MONITOR INST.: OVA	TOT DPTH: 24.87FT.	DPTH TO $\nabla$ 17.62 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 8/25/92		SITE: 3450S	

DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0					SAND: tan to yellow-brown, very fine- to fine-grained.		SP		
5									
10			12/24	0				1,1,5,8	
15			8/24	0				1,3,8,10	
20			8/24	-	SAND: tan to very light brown, very fine- to fine-grained.			5,8,13,18	
25			16/24	-				2,4,7,9	

TITLE: NADEP Pensacola				LOG of WELL: PEN-3450S-MW7		BORING NO. SB4	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc.				DATE STARTED: 8/25/92		COMPLTD: 8/25/92	
METHOD: 4.25" HSA		CASE SIZE: 2 inches		SCREEN INT.: 14.9-24.9'		PROTECTION LEVEL: D	
TOC ELEV.: 18.80 FT.		MONITOR INST.: OVA		TOT DPTH: 24.88FT.		DPTH TO $\nabla$ 16.35 FT.	
LOGGED BY: B. Anderson		WELL DEVELOPMENT DATE: 8/25/92				SITE: 3450S	

DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0					SAND: yellow to yellow-brown, very fine- to fine-grained, 10% silt, well rounded, loose, damp.		SM		
5									
10		7/24		0	SAND: yellow to yellow-brown, very fine- to fine-grained, well rounded, loose, damp.		SP		
15		7/24		0	SAND: white, very fine- to fine-grained, well rounded, loose, wet.				
20		7/24		-	SAND: white, very fine- to fine-grained, well rounded, loose, saturated.				
25									

TITLE: NADEP Pensacola				LOG of WELL:		BORING NO. SB5	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc.				DATE STARTED: 12/28/93		COMPLTD: 12/28/93	
METHOD: Hand auger		CASE SIZE:		SCREEN INT.:		PROTECTION LEVEL: D	
TOC ELEV.: FT.		MONITOR INST.: OVA		TOT DPTH: 10FT.		DPTH TO ▽ FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE:				SITE: 3450S	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
							SP		
		✕		0	SAND: Yellow-brown, very fine- to fine-grained, no odor.				
		✕		0					
5		✕		0	SAND: Brown, very fine- to fine-grained, no odor.				
		✕		0					
		✕		0					
10		✕		0					
15									
20									

TITLE: NADEP Pensacola				LOG of WELL:		BORING NO. SB6			
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30			
CONTRACTOR: Groundwater Protection Inc.				DATE STARTED: 12/28/93		COMPLTD: 12/28/93			
METHOD: Hand auger		CASE SIZE:		SCREEN INT.:		PROTECTION LEVEL: D			
TOC ELEV.: FT.		MONITOR INST.: OVA		TOT DPTH: 6FT.		DPTH TO $\nabla$ FT.			
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE:				SITE: 3450S			
DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0	SAND: Orange-brown, very fine- to fine-grained, no odor.		SP		
				0					
5				0	SAND: Tan-brown, very fine- to fine-grained, no odor.				
10									
15									
20									

TITLE: NADEP Pensacola				LOG of WELL:		BORING NO. SB7			
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30			
CONTRACTOR: Groundwater Protection Inc.				DATE STARTED: 1/15/93		COMPLTD: 1/15/93			
METHOD: 4.25' HSA		CASE SIZE:		SCREEN INT.:		PROTECTION LEVEL: D			
TOC ELEV.: FT.		MONITOR INST.: OVA		TOT DPTH: 12FT.		DPTH TO $\nabla$ FT.			
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE:				SITE: 3450S			
DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0					SAND: Orange-brown, very fine- to fine-grained, no odor.		SP		
5				0	SAND: Brown with some orange, very fine- to fine-grained, no odor.				
10				1					
15									
20									



**APPENDIX C**  
**INVESTIGATIVE METHODOLOGIES AND PROCEDURES**

### Soil Boring Methods

Boreholes were advanced using 4.25-inch inside diameter (ID), hollow-stem augers using a rotary drill rig. Soil samples were collected from each borehole using a standard penetration test (SPT) split-spoon sampler. SPT samples were generally collected at 5-foot intervals to the total depth of the well. The soil samples collected above the water table were placed in 16-ounce glass jars and head space analyses were performed using an organic vapor analyzer (OVA) with a flame ionization detector (FID) following Florida Department of Environmental Regulation (FDER) Chapter 17-770.200(2), Florida Administrative Code (FAC), guidelines. Soil samples from below the water table were analyzed using a portable gas chromatograph (GC) calibrated to detect benzene, ethyl benzene, toluene, and xylene (BETX) to the part per billion (ppb) level. The purpose of the screening procedure was to optimize monitoring well placement during the investigation.

### Monitoring Well Construction

Monitoring wells were installed in all of the boreholes drilled at the site. Monitoring wells PEN-3450S-MW4 through PEN-3450S-MW7 were constructed of 2-inch inside diameter (ID), schedule 40, polyvinyl (PVC) casing with flush-threaded joints and 10 feet of 0.010-inch machine-slotted screen. PVC well casings extend from the top of the screen to land surface. A 20/30 grade silica sand filter pack was placed in the annular space to approximately 2 to 3 feet above the top of the screen. A 1- to 2-foot thick bentonite seal was then placed on top of the filter pack. The remaining annular space was grouted to the surface with a neat cement grout. A protective traffic-bearing vault was installed to complete each well location. In concreted areas, the well pad consisted of 6-inch thick reinforced concrete around the traffic-bearing vault to the depth of the surrounding concrete. Each monitoring well is equipped with a locking well cap and a padlock. Figure C-1 depicts a typical monitoring well installation for the site.

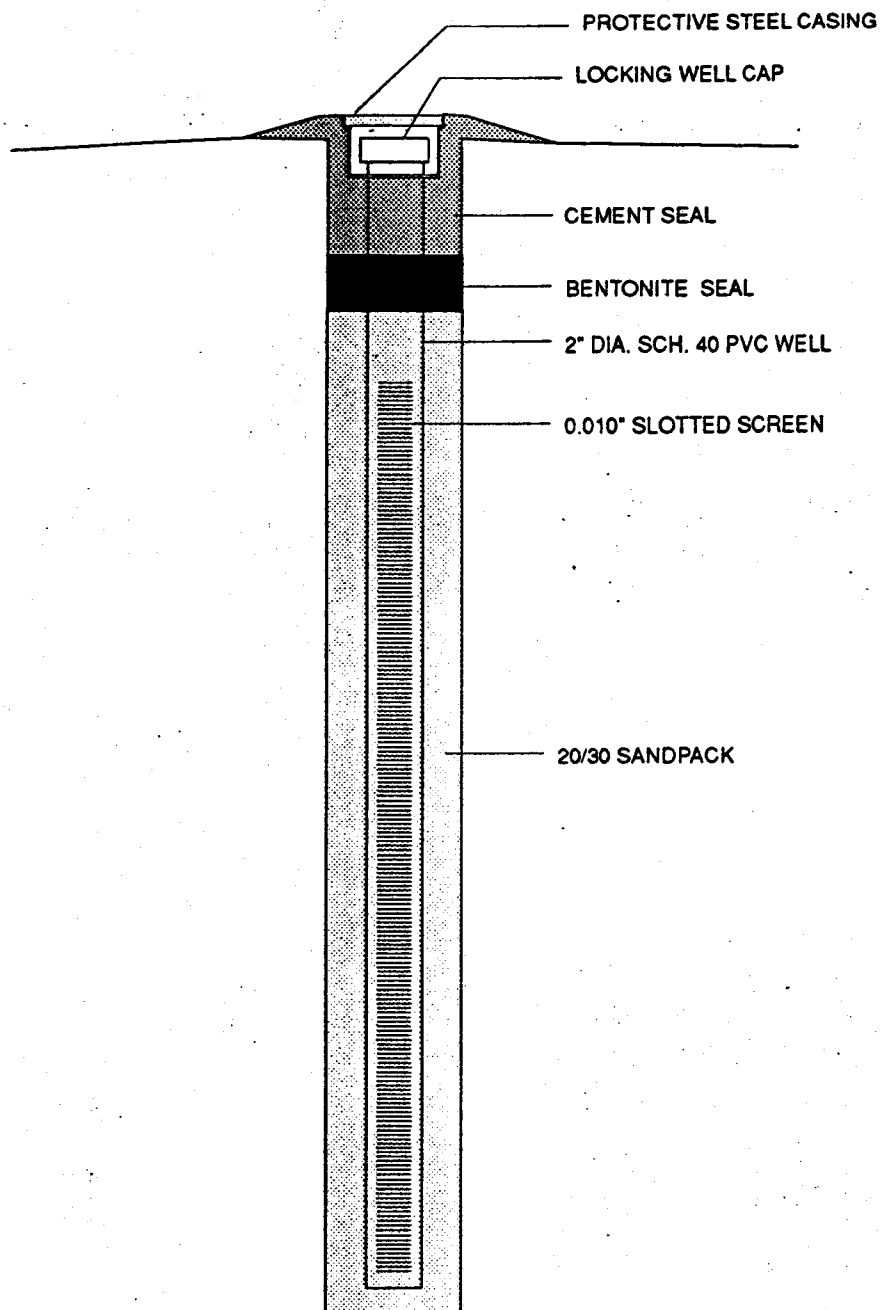
The three existing monitoring wells, designated PEN-3450S-MW1 through PEN-3450S-MW3, were constructed of 2-inch ID PVC casing. The exact screened interval, slot size and well construction methods for these wells are not known; however, the total depths of these wells indicate that they are screened at approximately the same interval as monitoring wells PEN-3450S-MW4 through PEN-3450S-MW7.

### Water Level Measurements

Groundwater levels were measured using an electric water level indicator and an engineering tape divided into increments of 0.01 foot. The wells were checked for the presence of free product by visual observation of a groundwater sample taken from each well using an extruded Teflon™ bailer. Water level elevations were calculated by subtracting the measured depth to groundwater from the elevation at the top of the well casing.

### Groundwater Sampling

Groundwater samples were collected in accordance with ABB Environmental Services, Inc. (ABB-ES), Florida Department of Environmental Regulation (FDER)-approved Comprehensive Quality Assurance Plan (CompQAP). The monitoring wells were purged with a Teflon™ bailer. Purging continued until five well volumes had been removed from the well. Groundwater samples were collected using an extruded Teflon™ bailer.



**FIGURE C-1**

**MONITORING WELL  
CONSTRUCTION DIAGRAM**



**CONTAMINATION  
ASSESSMENT REPORT  
SITE 3450S  
NADEP PENSACOLA  
PENSACOLA, FLORIDA**

The samples were placed into appropriate containers, properly preserved, and placed on ice. Samples were then shipped to Wadsworth/ALERT Laboratories, Inc., in Tampa, Florida. All groundwater samples collected were analyzed for constituents of the gasoline analytical group as outlined in FDER Chapter 17-770, FAC.

#### Slug Test Procedures

The slug test developed by Bouwer and Rice (1976) measures the saturated hydraulic conductivity (K) using a single well. The test method used is termed a "rising head" test and is performed by quickly withdrawing a volume of water (slug) from the well and measuring the subsequent rate of the rising water level in the well. Bouwer (1989) recommends the rising head slug test for wells with screened intervals that are only partially submerged or partially penetrate unconfined aquifers.

The slug was constructed of 1-inch outside diameter PVC pipe, 5 feet in length, filled with sand, and capped watertight at both ends. The water level changes in the monitoring wells were recorded using a data logger and pressure transducer. The pressure transducer was suspended less than 1 foot above the bottom of the well and an initial water level was recorded prior to beginning the test. The slug was then lowered into the well to a depth below the original water table. Water levels were then observed until they stabilized at the original level. Generally, recovery occurred within 3 to 4 seconds. Following stabilization, the slug was quickly removed and water level measurements were recorded over time until the water level returned to the original level. Three rising head tests were conducted for each well in order to obtain an average recovery response.

**APPENDIX D**  
**AQUIFER PARAMETER CALCULATIONS**

## Aquifer Parameter Calculations

### Hydraulic gradient

Water table elevations were plotted on a map of the site. A water table contour map was drawn with flow lines (depicting groundwater flow direction) perpendicular to the groundwater elevation contours. The average groundwater hydraulic gradient was calculated by subtracting the differences in groundwater elevation (in feet) between two points on the map and dividing the elevation difference by the distance between the two points to obtain a resulting gradient in feet per foot. Water elevation data collected on February 19 and March 31, 1992, were used to calculate hydraulic gradients at the site. For each date, three traverses were made perpendicular to equipotential contour lines to calculate an average site hydraulic gradient. For each traverse, the hydraulic gradient was calculated as follows:

$$i = \frac{(h_1 - h_2)}{d} \quad (1)$$

where

- i = hydraulic gradient (feet per foot [ft/ft]),
- $h_1$  = water table elevation, upgradient (feet),
- $h_2$  = water table elevation, downgradient (feet), and
- d = horizontal distance (feet) between  $h_1$  and  $h_2$  along a flow line.

Hydraulic gradients calculated in this manner varied from  $6.6 \times 10^{-3}$  ft/ft to  $9.3 \times 10^{-3}$  ft/ft. The average hydraulic gradient at the site was calculated to be  $8.0 \times 10^{-3}$  ft/ft.

### Hydraulic conductivity

Hydraulic conductivity from slug test data was calculated following the methods of Bouwer and Rice (1976) and Bouwer (1989) for partially penetrating wells screened in unconfined aquifers. The following well information is needed to assess the hydraulic conductivity:

- radius of well casing ( $r_c$ ),
- $r_w$  = radius of borehole ( $r_c$  plus radius of the sand pack surrounding the well screen),
- length of screened interval below the water table ( $L_s$ ),
- effective well radius ( $r_e$ ),
- depth of well below the water table ( $L_w$ ),
- depth to confining unit or bottom of aquifer below the static water table (H), and

- plot of time versus the logarithm of y, where y is the difference between the static water level outside the well and the water level inside the well.

Figure D-1 is a well diagram depicting most of the aquifer and well parameters. Calculations were made assuming that  $L_w < H$ . Hydraulic conductivity, K, was calculated as follows:

$$K = [R_c^2 \ln(\frac{r_e}{r_w}) - 2L_e] [\frac{1}{t} \ln(\frac{y_0}{y_t})] \quad (2)$$

where

$y_0$  = y at time zero, and  
 $y_t$  = y at time t.

The effective well radius,  $r_e$ , and the term  $[(1/t)\ln(y_0/y_t)]$  were derived by using the computer program AQTESOLV™ (Geraghty & Miller, Inc., 1989). This computer program follows procedures and assumptions outlined by Bouwer (1989).

Slug test graphs are attached at the end of this appendix. Values of y were calculated for a particular time, t, and plotted on the graph. The computer program selects a "best-fit" line through the data points by linear regression along a "straight-line" portion of the graph. The slope of the "best-fit" line is used to calculate the hydraulic conductivity, K.

Three slug tests each were performed inside well PEN-3450S-MW2. Hydraulic conductivity, K, is reported in feet per minute (ft/min) on the slug test graphs, and was recalculated to feet per day (ft/day). K was found to vary from  $2.7 \times 10^1$  ft/day to  $3.4 \times 10^1$  ft/day with an average K of  $3.0 \times 10^1$  ft/day.

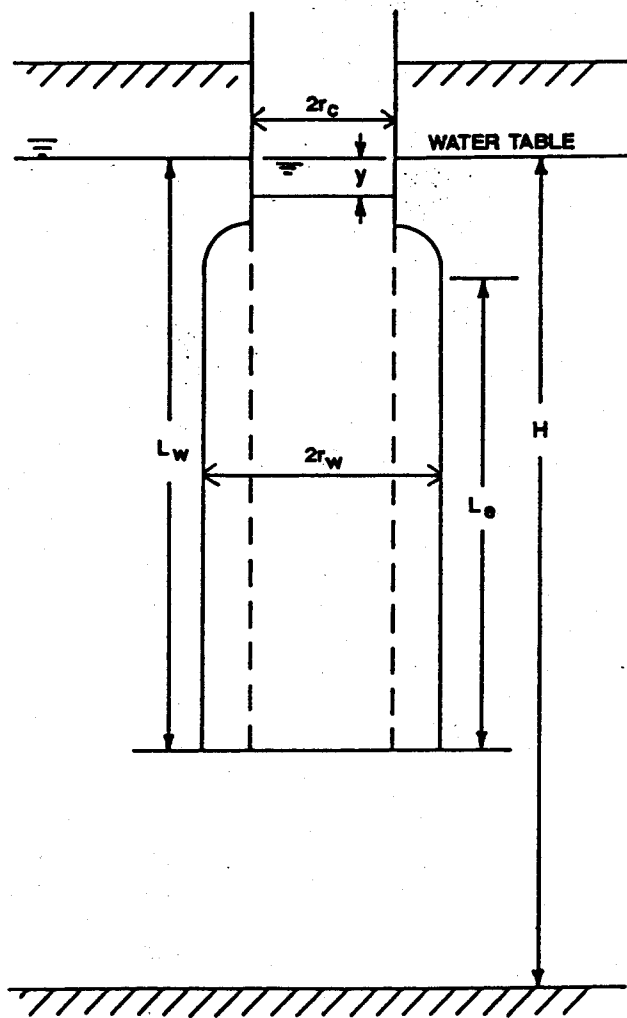
#### Average pore water velocity

Estimates of average pore water velocity were obtained using the following formula:

$$V = \frac{(K \cdot i)}{n} \quad (3)$$

where

V = seepage velocity in ft/day,  
 K = hydraulic conductivity in ft/day,  
 i = hydraulic gradient, and  
 n = estimated porosity.



- $r_c$  - radius of well.
- $r_w$  - radius of well + total thickness of the sand/gravel pack.
- $L_s$  - length of screened interval below the water table.
- $L_w$  - depth of well below water table.
- $H$  - depth to confining unit below the water table.
- $y$  - difference between static water level outside well and water level inside well.

**FIGURE D-1**

**DEFINITIONS OF SLUG TEST  
PARAMETERS (from Bouwer, 1989)**



**CONTAMINATION  
ASSESSMENT REPORT  
SITE 3450S  
NADEP PENSACOLA  
PENSACOLA, FLORIDA**



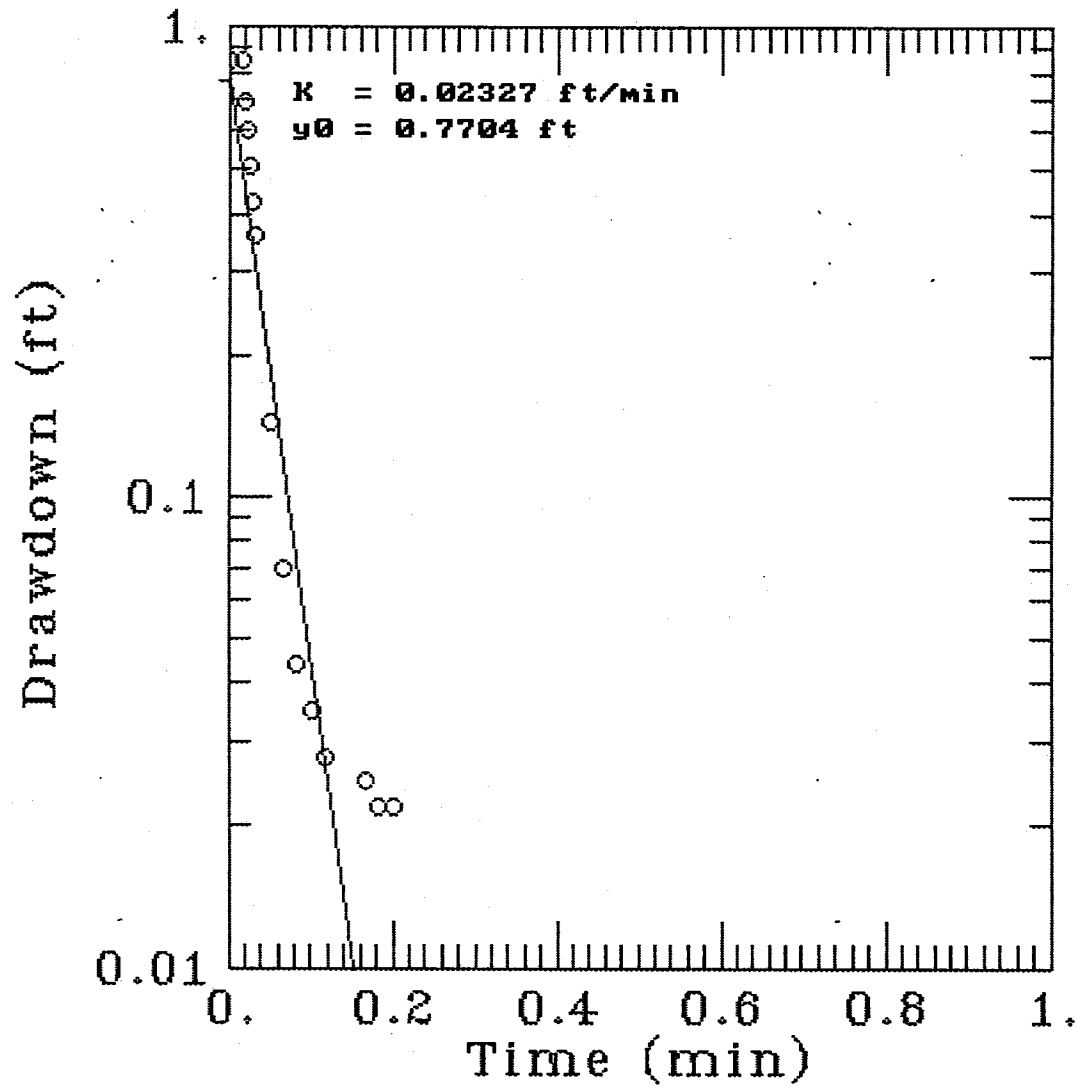
Porosities of unconsolidated sands range from 25 to 50 percent (Freeze and Cherry, 1979). Using an estimated porosity (n) of 30 percent, an average hydraulic gradient of  $8.0 \times 10^{-3}$ , and an average hydraulic conductivity of  $3.0 \times 10^1$  ft/day, the average pore water velocity is calculated as follows:

$$v = \frac{3.0 \times 10^1 \text{ ft/day} \times 8.0 \times 10^{-3} \text{ ft/ft}}{0.30}$$

$$v = 3.0 \times 10^{-1} \text{ ft/day} = 8.0 \times 10^{-1}$$

## **SLUG TEST PLOTS**

# PEN-3450S-MW-2 RUN #1



AQTESOLV



GERAGHTY  
& MILLER, INC.



Modeling Group

A Q T E S O L V    R E S U L T S  
Version    1.10

08/07/92

15:34:23

=====
TEST DESCRIPTION
=====

Data set..... A:3450S2R1.SET  
Data set title..... PEN-3450S-MW-2 RUN #1

Knowns and Constants:

No. of data points..... 14  
Radius of well casing..... 0.083  
Radius of well..... 0.334  
Aquifer saturated thickness..... 6.7  
Well screen length..... 10  
Static height of water in well..... 6.7  
Log(Re/Rw)..... 2.312  
A, B, C..... 0.000,    0.000,    1.967

=====
ANALYTICAL METHOD
=====

Bouwer-Rice (Unconfined Aquifer Slug Test)

=====
RESULTS FROM VISUAL CURVE MATCHING
=====

VISUAL MATCH PARAMETER ESTIMATES

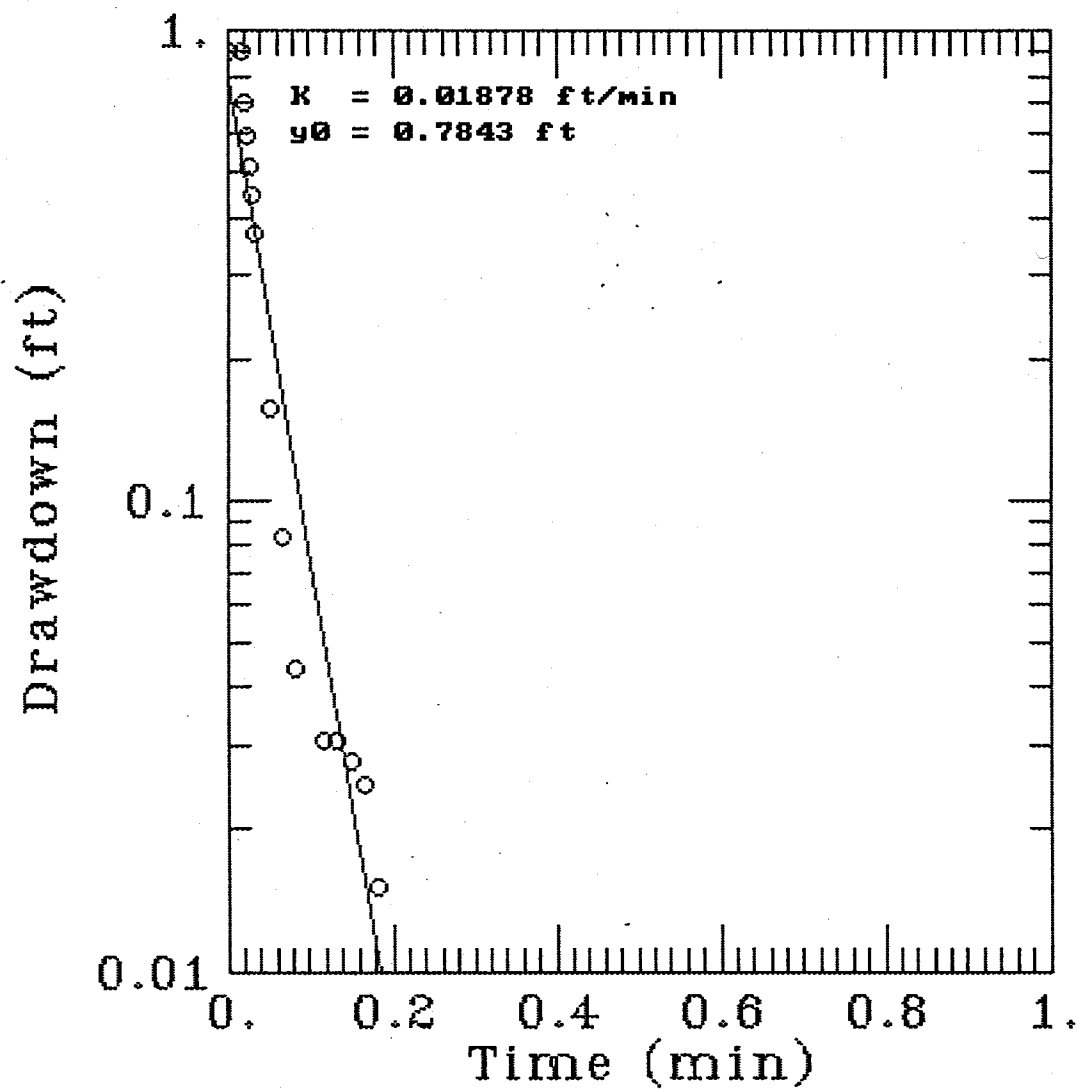
          Estimate  
K    =    1.6379E-002  
y0   =    6.9315E+234

TYPE CURVE DATA

K    = 2.32696E-002  
y0   = 7.70404E-001

Time            Drawdown            Time            Drawdown            Time            Drawdown  
-----        -            -----        -            -----        -  
0.000E+000    7.704E-001    1.000E+000    1.574E-013

# PEN-3450S-MW-2 RUN #2



AQTESOLV



GERAGHTY  
& MILLER, INC.



Modeling Group

=====

A Q T E S O L V     R E S U L T S  
Version 1.10

08/07/92

15:57:53

=====

TEST DESCRIPTION

Data set..... A:3450S2R2.SET  
Data set title..... PEN-3450S-MW-2 RUN #2

Knowns and Constants:

No. of data points..... 14  
Radius of well casing..... 0.083  
Radius of well..... 0.334  
Aquifer saturated thickness..... 6.7  
Well screen length..... 10  
Static height of water in well..... 6.7  
Log(Re/Rw)..... 2.312  
A, B, C..... 0.000, 0.000, 1.967

=====

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

=====

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

Estimate  
K = 1.8776E-002  
y0 = 6.9315E+234

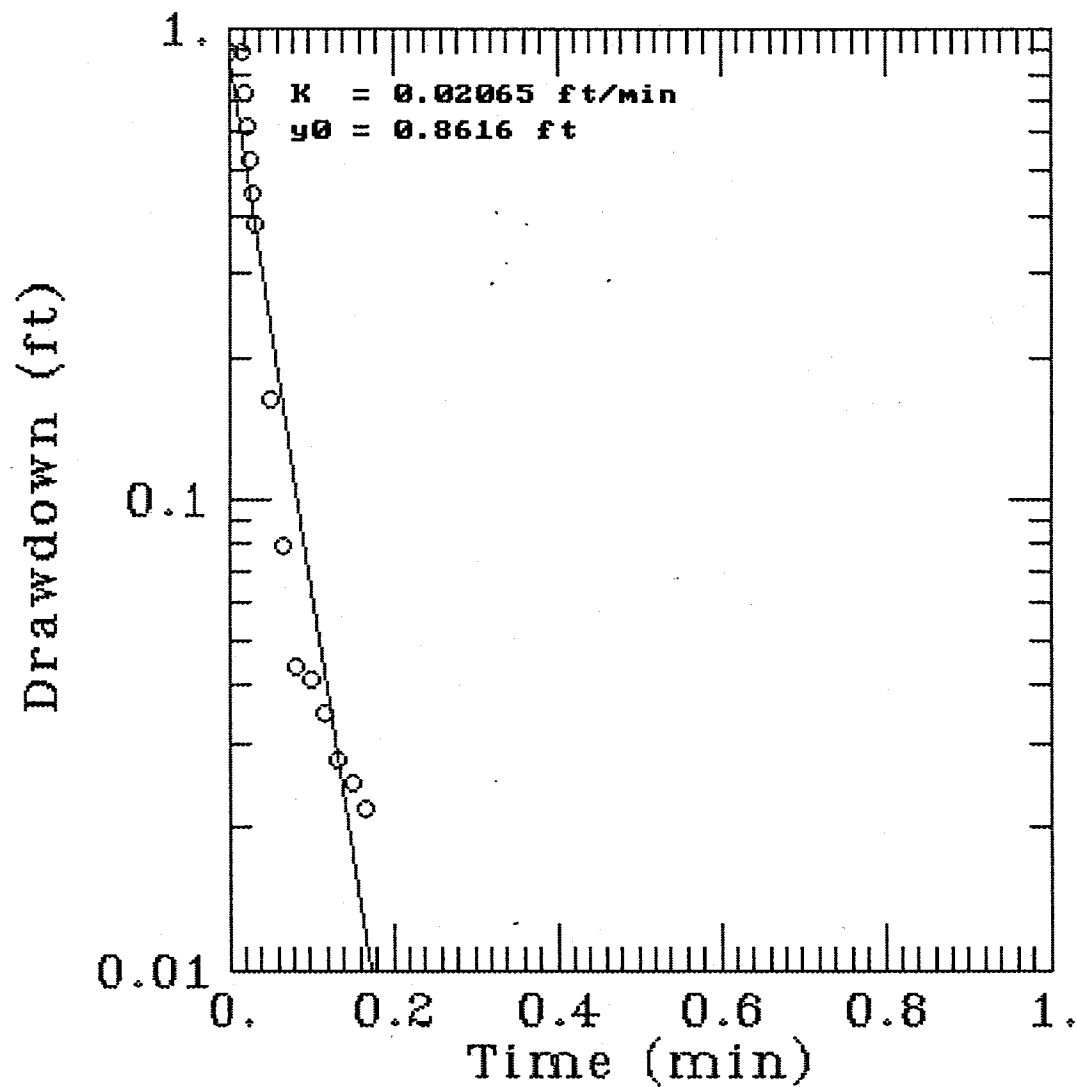
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TYPE CURVE DATA

K = 1.87762E-002  
y0 = 7.84296E-001

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	7.843E-001	1.000E+000	4.519E-011		

# PEN-3450S-MW-2 RUN #3



AQTESOLV



GERAGHTY  
& MILLER, INC.



Modeling Group

=====

A Q T E S O L V     R E S U L T S  
Version 1.10

08/07/92

15:53:59

=====

TEST DESCRIPTION

Data set..... A:3450S2R3.SET  
Data set title..... PEN-3450S-MW-2 RUN #3

Knowns and Constants:

No. of data points..... 14  
Radius of well casing..... 0.083  
Radius of well..... 0.334  
Aquifer saturated thickness..... 6.7  
Well screen length..... 10  
Static height of water in well..... 6.7  
Log(Re/Rw)..... 2.312  
A, B, C..... 0.000, 0.000, 1.967

=====

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

=====

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

Estimate  
K = 2.0653E-002  
y0 = 6.9315E+234

=====

TYPE CURVE DATA

K = 2.06530E-002  
y0 = 8.61553E-001

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	8.616E-001	1.000E+000	4.703E-012		



**APPENDIX E**  
**LABORATORY ANALYTICAL DATA**

## **SOIL LABORATORY ANALYSES**



WADSWORTH/ALERT Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2L3105-1  
MATRIX: SOIL

DATE RECEIVED: 12/31/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/ 5/93

SAMPLE ID: 34505-SB5 (6')

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 8010/8020 - GC

DRY WEIGHT (%): 80

Benzene	ND	1,4-Dichlorobenzene	ND
Benzyl chloride	ND	Dichlorodifluoromethane	ND
Bromobenzene	ND	1,1-Dichloroethane	ND
Bromodichloromethane	ND	1,2-Dichloroethane	ND
Bromoform	ND	1,1-Dichloroethylene	ND
Bromomethane	ND	cis-1,2-Dichloroethylene	ND
Carbon tetrachloride	ND	trans-1,2-Dichloroethylene	ND
Chlorobenzene	ND	Dichloromethane	22 B
Chloroethane	ND	1,2-Dichloropropane	ND
Chloroform	ND	trans-1,3-Dichloropropylene	ND
1-Chlorohexane	ND	Ethylbenzene	ND
2-Chloroethyl vinyl ether	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	1,1,1,2-Tetrachloroethane	ND
Chlorotoluene	ND	Tetrachloroethylene	ND
Dibromochloromethane	ND	Toluene	ND
Dibromomethane	ND	1,1,1-Trichloroethane	ND
1,2-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,3-Dichlorobenzene	ND	Trichloroethylene	ND

NOTE: ND (None Detected, lower detectable limit = 6 ug/kg) dry weight  
ND\* (None Detected, lower detectable limit = ug/kg) dry weight  
-- (Not Analyzed)



WADSWORTH/ALERT Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2L3105-1  
MATRIX: SOIL

DATE RECEIVED: 12/31/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/ 5/93

SAMPLE ID: 34505-SB5 (6')

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 8010/8020 - GC

Trichlorofluoromethane	ND
Trichloropropane	ND
Vinyl chloride	ND
Xylenes	ND
Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 6 ug/kg) dry weight  
ND\* (None Detected, lower detectable limit = ug/kg) dry weight  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
Bromochloromethane (HECD)	96	(78-122)	(49-121)	(75-125)
Trifluorotoluene (PID)	106	(73-131)	(70-123)	(75-125)



WADSWORTH/ALERT Laboratories

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2L3105-1  
MATRIX : SOIL

DATE RECEIVED: 12/31/92

SAMPLE ID : 34505-SB5 (6')

CERTIFICATION #: E84059  
HRS84297

ANALYTICAL REPORT

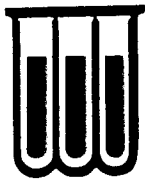
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PARAMETER	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Tot Recoverable Pet Hydrocarbons	1/ 5- 1/ 6/93	ND	5 mg/kg

NOTE: ND (None Detected)

**GROUNDWATER SAMPLE ANALYSES**

**January 26, 1992**



WADSWORTH/ALERT  
LABORATORIES

5910 Breckenridge Pkwy., Suite H, Tampa, FL 33610

Sampling, testing, mobile labs

Since 1938

# ANALYTICAL REPORT

SUBCONTRACT NUMBER: 1-08-134

TASK ORDER NUMBER: 0015

NAS/NADEP PENSACOLA - PHASE II

Presented to:

ROGER DURHAM

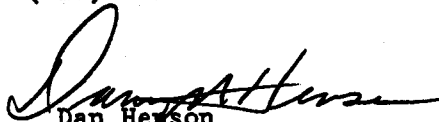
ABB ENVIRONMENTAL SERVICES, INC.

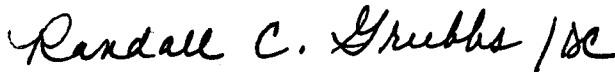
WADSWORTH/ALERT LABORATORIES

5910 BRECKENRIDGE PARKWAY, SUITE H

TAMPA, FL 33610

(813) 621-0784

  
Dan Hexson  
Project Manager



Randall C. Grubbs  
Laboratory Director - Florida

February 12, 1992



HEADQUARTERS AND  
LABORATORY  
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4101 Shuffel Drive, N.W.  
North Canton, OH 44720  
(216) 497-9396

REGIONAL  
LABORATORY  
P.O. Box 31454  
5405 Schaaf Rd.  
Cleveland, OH 44131  
(216) 642-9151

REGIONAL  
OFFICE  
1445 Pisgah Church Rd.  
Lexington, SC 29072  
(803) 957-8590

REGIONAL  
LABORATORY  
5910 Breckenridge Pkwy  
Suite H  
Tampa, FL 33610  
(813) 621-0784



WADSWORTH/ALERT

LABORATORIES 5910 Breckenridge Pkwy., Suite H, Tampa, FL 33610

Sampling, testing, mobile labs

Since 1938

February 12, 1992

Mr. Roger Durham  
ABB Environmental Services, Inc.  
2571 Executive Center Circle East  
Suite 100  
Tallahassee, FL 32301

Dear Mr. Durham:

Over the course of the past month, it was noted that toluene has begun randomly appearing in samples, trip blanks and equipment blanks at levels ranging from about 2 ug/L to about 22 ug/L. We have investigated its presence and feel that we have located the source of this random contamination problem.

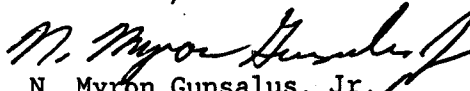
WAL began using custom printed sample container labels this past fall. At that time we evaluated the labels for any trace contaminants and found none. In late December we received a second shipment of identical labels and began using them for sampling kits sent out after 20 December 1991. The investigation of the toluene contamination led us to evaluate this second shipment of labels as well. Upon evaluation, it was found that these labels are contaminated with Toluene as well as 2-Butanone (MEK). Given that these are volatile compounds it can be demonstrated that, under certain conditions, these compounds might migrate across the septum of the sample vial.

We have discontinued use of these labels and are attempting to reissue new labels and bottles for any sample kits which are still pending. In addition we are working with the printer to determine why these labels were not made to our previously determined specifications. We have also established a policy of testing all label batches before they may be used in any kits.

The impact which these findings have on any recent or current analytical data must be determined on an individual basis. If you have any questions regarding this matter or would like to further investigate particular results, please contact your project manager or myself at (813) 621-0784. Thank you for your patience and help in this matter.

Sincerely,

Wadsworth/ALERT Laboratories

  
N. Myron Gunsalus, Jr.  
Quality Control Coordinator



HEADQUARTERS AND  
LABORATORY  
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(803) 957-8590

REGIONAL  
LABORATORY  
5910 Breckenridge Pkwy  
Suite H  
Tampa, FL 33610  
(813) 621-0784





WADSWORTH/ALERT  
LABORATORIES

#### INVOLVEMENT

This report summarizes the analytical results of the NAS/NADEP Pensacola - Phase II site submitted by ABB Environmental Services, Inc. to Wadsworth/ALERT Laboratories who provided independent, analytical services for this project under the direction of Roger Durham. The samples were accepted into Wadsworth's Florida facility on 28 January 1992, in accordance with documented sample acceptance procedures. The associated analytical methods and sample results are outlined sequentially in this report.

Analytical results included in this report have been reviewed for compliance with the Laboratory QA/QC Plan as summarized in the Quality Control Section at the rear of the report. Sample custody documentation describing the number of samples and sample matrices is also included. Any qualifications and/or non-compliant items have been noted below.



WADSWORTH/ALERT  
LABORATORIES

### ANALYTICAL METHODS

Wadsworth/ALERT Laboratories utilizes only USEPA approved analytical methods and instrumentation. The analytical methods utilized for the analysis of these samples are listed below.

PARAMETER	METHOD
-----	
ORGANICS	
Volatile Organics	** EPA Method 601/2
Ethylene Dibromide	** EPA Method 601 Mod.
METALS	
Lead	** EPA Method 239.2

NOTE: \*\* Indicates usage of this method to obtain results for this report.

EPA Methods -Methods for Chemical Analysis of Water and Wastes, USEPA, 600/4-79-020, March, 1983. July, 1982  
Drinking Waters USEPA, 600/4-88/039, December, 1988.

Std. Methods -Standard Methods for the Examination of Water and Wastewater, APHA, 16th edition, 1985.

USEPA Methods -From 40CFR Part 136, published in Federal Register on October 26, 1984.

SW846 Methods -Test Methods for Evaluating Solid Waste Physical/Chemical Methods, 3rd Edition, USEPA, 1986.

ASTM Methods -American Society for Testing and Materials.

NIOSH Method -NIOSH Manual of Analytical Methods, National Institute for Occupational Safety and Health, 2nd Edition, April 1977.



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2A2811-1  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/31/92

SAMPLE ID: MW 1 NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	3
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	7
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	2
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	62	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	2

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	102	(78-122)
Trifluorotoluene (PID)	102	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2A2811-1  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/29/92

SAMPLE ID: MW 1      NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2A2811-1  
MATRIX : WATER

DATE RECEIVED: 1/28/92

SAMPLE ID : MW 1      NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	1/30/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2A2811-2  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/31/92

SAMPLE ID: MW 2      NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

**VOLATILE ORGANICS**  
**METHOD 601/602 - GC**

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	10
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	96	(78-122)
Trifluorotoluene (PID)	103	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2A2811-2  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/29/92

SAMPLE ID: MW 2      NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2A2811-2  
MATRIX : WATER

DATE RECEIVED: 1/28/92

SAMPLE ID : MW 2      NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

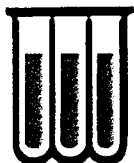
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Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	1/30/92	ND	5	ug/L

NOTE: ND (None Detected)





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2A2811-3  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/31/92

SAMPLE ID: MW 3      NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

**VOLATILE ORGANICS**  
**METHOD 601/602 - GC**

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	1
Bromoform	ND	1,2-Dichloroethene (Total)	4
Bromomethane	ND	1,2-Dichloropropane	1
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	2
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	8
Dichlorodifluoromethane	ND	Trichlorofluoromethane	36
1,1-Dichloroethane	110	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	92	(78-122)
Trifluorotoluene (PID)	101	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2A2811-3  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/29/92

SAMPLE ID: MW 3      NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2A2811-3  
MATRIX : WATER

DATE RECEIVED: 1/28/92

SAMPLE ID : MW 3      NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	1/30/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2A2811-4  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/31/92

SAMPLE ID: MW 4 NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	2	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	100	(78-122)
Trifluorotoluene (PID)	102	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2A2811-4  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/29/92

SAMPLE ID: MW 4      NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2A2811-4  
MATRIX : WATER

DATE RECEIVED: 1/28/92

SAMPLE ID : MW 4      NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	1/30/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2A2811-5  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/31/92

SAMPLE ID: DUPLICATE      NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	3	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	104	(78-122)
Trifluorotoluene (PID)	101	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2A2811-5  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/29/92

SAMPLE ID: DUPLICATE      NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)





WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2A2811-5  
MATRIX : WATER

DATE RECEIVED: 1/28/92

SAMPLE ID : DUPLICATE      NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	1/30/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2A2811-6  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/31/92

SAMPLE ID: EQUIPMENT BLANK

NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059

VOLATILE ORGANICS  
METHOD 601/602 - GC

HRS84297

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	92	(78-122)
Trifluorotoluene (PID)	101	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2A2811-6  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/29/92

SAMPLE ID: EQUIPMENT BLANK      NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2A2811-6  
MATRIX : WATER

DATE RECEIVED: 1/28/92

SAMPLE ID : EQUIPMENT BLANK      NADEP PENSACOLA/ 3450 S

CERTIFICATION #: E84059  
HRS84297

**METALS ANALYTICAL REPORT  
SELECTED LIST**

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	1/30/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2A2811-7  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/31/92

SAMPLE ID: TRIP BLANK

NADEP PENSACOLA/ 3450 S

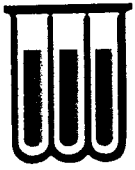
CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	2
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	85	(78-122)
Trifluorotoluene (PID)	102	(73-131)



WADSWORTH/ALERT  
LABORATORIES

## **QUALITY CONTROL SECTION**

- Quality Control Summary
- Laboratory Blanks
- Laboratory Control Sample
- Matrix Spike/Matrix Spike Duplicate Results
- Sample Custody Documentation



WADSWORTH/ALERT  
LABORATORIES      QUALITY ASSURANCE / QUALITY CONTROL  
PROGRAM SUMMARY

Wadsworth/ALERT Laboratories considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with various analytical result reports. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow.

Surrogate Spike Recovery Evaluations

Known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added, as appropriate, to routine GC and GC/MS sample fractions prior to extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is an indication of the overall method efficiency for the individual sample. This surrogate spike recovery data is displayed alongside acceptable analytical method performance limits at the bottom of each applicable analytical result report sheet.

NOTE: Acceptable method performance for Base/Neutral Acid extractables is indicated by two (2) of three (3) surrogates for each fraction with a minimum recovery of ten (10) percent each. For Pesticides one (1) of two (2) surrogates meeting performance criteria is acceptable.

Laboratory Analytical Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interferences and background contamination levels associated with each analytical method. These method blanks include all aspects of actual laboratory method analysis (chemical reagents, glassware, etc.), substituting laboratory reagent water or solid for actual sample. The method blank must not contain any analytes above the reported detection limit. The following common laboratory contaminants are exceptions to this rule provided they are not present at greater than five times the detection limit.

Volatiles

Methylene chloride  
Toluene  
2-Butanone  
Acetone

Semi-volatiles

Dimethyl phthalate  
Diethyl phthalate  
Di-n-butyl phthalate  
Butyl benzyl phthalate  
Bis (2-ethylhexyl) phthalate

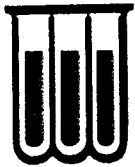
Metals

Calcium  
Magnesium  
Sodium

A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method blanks.

Laboratory Analytical Method Check Sample Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to a laboratory reagent blank prior to extraction and analysis. Percent recovery determinations demonstrate the performance of the analytical method. Failure of a check sample to meet established laboratory recovery criteria is cause to stop the analysis until the problem is resolved.



WADSWORTH/ALERT  
LABORATORIES      QUALITY ASSURANCE / QUALITY CONTROL  
PROGRAM SUMMARY  
(cont'd)

At that time all associated samples must be re-analyzed. A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method check samples.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to two of three separate aliquots of a sequentially predetermined sample prior to extraction and analysis. Percent recovery determinations are calculated from both of the spiked samples by comparison to the actual values generated from the unspiked sample. These percent recovery determinations indicate the accuracy of the analysis at recovering actual analytical method compounds from the matrix. Relative percent difference determinations calculated from a comparison of the MS/MSD recoveries demonstrate the precision of the analytical method. Actual percent recovery and relative percent difference data is displayed alongside their respective acceptable analytical method performance limits in the QA/QC section of the report. The MS/MSD are considered in control when the precision is within established control limits and the associated check sample has been found to be acceptable. A minimum of ten percent (10%) of all analyses are MS/MSD quality control samples.

\*\*\*\*\*EXAMPLE\*\*\*\*\*

COMPOUND	SAMPLE CONC.	MS %REC	MSD %REC	RPD	QC LIMITS	
					RPD	RECOVERY
4,4'-DDT	0	95	112	16	22	66-119
Benzene	10	86	93	8	20	39-150

(cmpd. name)	sample	1st%	2nd%	Rel.%	accep. method
	result	recov.	recov.	diff.	perform range

Analytical Result Qualifiers

The following qualifiers, as defined below, may be appended to analytical results in order to allow proper interpretation of the results presented:

J - indicates an estimated concentration (typically used when a dilution, matrix interference or instrumental limitation prevents accurate quantitation of a particular analyte).

B - indicates the presence of a particular analyte in the laboratory blank analyzed concurrently with the samples. Results must be interpreted accordingly.

DIL - indicates that because of matrix interferences and/or high analyte concentrations, it was necessary to dilute the sample to a point where the surrogate or spike concentrations fell below a quantifiable amount and could not be reported.





WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2A2811-BK  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/31/92

SAMPLE ID: LABORATORY BLANK

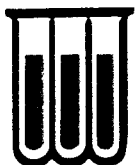
CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	100	(78-122)
Trifluorotoluene (PID)	102	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2A2811-BK  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/ 5/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	110	(78-122)
Trifluorotoluene (PID)	103	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 2A2811-BK  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 2/ 7/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	116	(78-122)
Trifluorotoluene (PID)	103	(73-131)



WADSWORTH/ALERT  
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2A2811-BK  
MATRIX: WATER

DATE RECEIVED: 1/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/29/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

---

PARAMETER	RESULT (ug/L )	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd  
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT  
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.  
LAB #: 2A2811-BK  
MATRIX : WATER

DATE RECEIVED: 1/28/92

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059  
HRS84297

METALS ANALYTICAL REPORT  
SELECTED LIST

---

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	1/30/92	ND	ug/L	5

NOTE: ND (None Detected)



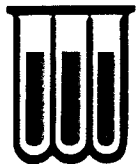
WADSWORTH/ALERT  
LABORATORIES

LAB #: 2A2811-LCS  
MATRIX: WATER  
METHOD: 601/2

DATE RECEIVED: 01/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 01/31/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
1,1-Dichloroethene	71	43-131
Trichloroethene	85	75-123
Chlorobenzene	96	58-133
Toluene	94	70-117
Benzene	91	70-117
Dichlorobromomethane	75	61-133



WADSWORTH/ALERT  
LABORATORIES

LAB #: 2A2811-LCS  
MATRIX: WATER  
METHOD: 601/2

DATE RECEIVED: 01/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/05/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
1,1-Dichloroethene	62	43-131
Trichloroethene	102	75-123
Chlorobenzene	105	58-133
Toluene	101	70-117
Benzene	95	70-117
Dichlorobromomethane	91	61-133



WADSWORTH/ALERT  
LABORATORIES

LAB #: 2A2811-LCS  
MATRIX: WATER  
METHOD: 601/2

DATE RECEIVED: 01/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/07/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
1,1-Dichloroethene	61	43-131
Trichloroethene	86	75-123
Chlorobenzene	112	58-133
Toluene	108	70-117
Benzene	99	70-117
Dichlorobromomethane	86	61-133





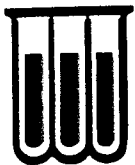
WADSWORTH/ALERT  
LABORATORIES

LAB #: 2A2811-LCS  
MATRIX: WATER  
METHOD: 601 Mod.

DATE RECEIVED: 01/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 01/29/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
Ethylene Dibromide	103	81-135



WADSWORTH/ALERT  
LABORATORIES

LAB #: 2A2811-LCS  
MATRIX: WATER

DATE RECEIVED: 01/28/92  
DATE PREP'D: 01/30/92  
DATE ANALYZED: 01/30/92

LABORATORY CHECK SAMPLE RECOVERY

COMPOUND	LCS %REC	QC LIMITS RECOVERY
Lead, furnace	91	64-131



WADSWORTH/ALERT  
LABORATORIES

LAB#: 2A2811-3  
MATRIX: WATER  
METHOD: 601/2

DATE RECEIVED: 01/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 02/07/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	MS	MSD	RPD	QC	LIMITS
	%REC	%REC		RPD	RECOVERY
1,1-Dichloroethene	45	51	12	28	43-131
Trichloroethene	88	97	10	13	75-123
Chlorobenzene	105	107	2	24	58-133
Toluene	102	104	2	16	70-117
Benzene	89	90	1	15	70-117
Dichlorobromomethane	91	90	1	22	61-133



WADSWORTH/ALERT  
LABORATORIES

LAB ID: 2A2811-2  
MATRIX: WATER  
METHOD: 601 Mod.

DATE RECEIVED: 01/28/92  
DATE EXTRACTED: NA  
DATE ANALYZED: 01/29/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	MS %REC	MSD %REC	RPD	QC LIMITS	
				RPD	RECOVERY
Ethylene Dibromide	105	96	9	25	81-135

**CONTAMINATION ASSESSMENT REPORT  
ADDENDUM**

**Site 3450W  
Naval Aviation Depot  
Naval Air Station  
Pensacola, Florida**

**UIC: N00204**

**Contract No. N62467-89-D-0317**

**Prepared by:**

**ABB Environmental Services, Inc.  
2590 Executive Center Circle, East  
Tallahassee, Florida 32301**

**Authors:**

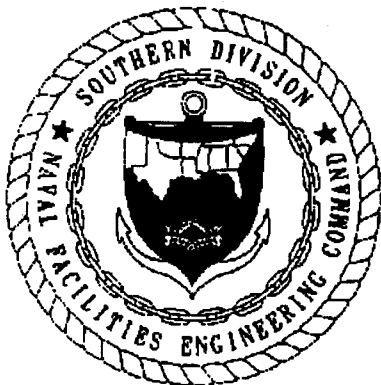
**Pamela J. Wagner  
Roger Durham**

**Prepared for:**

**Department of the Navy, Southern Division  
Naval Facilities Engineering Command  
2155 Eagle Drive  
North Charleston, South Carolina 29418**

**Luis Vazquez, Code 1843, Engineer-In-Charge**

**March 1993**



## FOREWORD

Subtitle I of the Hazardous and Solid Waste Amendments of 1984 to the Solid Waste Disposal Act (SWDA) of 1965 established a national regulatory program for managing underground storage tanks (USTs) containing hazardous materials, especially petroleum products. Hazardous wastes stored in USTs were already regulated under the Resource Conservation and Recovery Act of 1976, which was also an amendment to SWDA. Subtitle I requires that the U.S. Environmental Protection Agency (USEPA) promulgate UST regulations. The program was designed to be administered by the individual States, who were allowed to develop more stringent standards, but not less stringent standards. Local governments were permitted to establish regulatory programs and standards that are more stringent, but not less stringent than either State or Federal regulations. The USEPA UST regulations are found in the Code of Federal Regulations (CFR), Title 40, Part 280 (40 CFR 280) (*Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks*) and Title 40 CFR 281 (*Approval of State Underground Storage Tank Programs*). Title 40 CFR 280 was revised and published on September 23, 1988, and became effective December 22, 1988.

The Navy's UST program policy is to comply with all Federal, State, and local regulations pertaining to USTs. This report was prepared to satisfy the requirements of the Florida Department of Environmental Regulation (FDER) Chapter 17-770, Florida Administrative Code (FAC) (*State Underground Petroleum Environmental Response*) regulations on petroleum contamination in Florida's environment as a result of spills or leaking tanks or piping.

Questions regarding this report should be addressed to the Environmental Coordinator, Naval Aviation Depot (NADEP), Naval Air Station, Pensacola, Florida, at 904-452-2320, or to Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Code 1843, at DSN 563-0613 or 803-743-0613.

## EXECUTIVE SUMMARY

Site 3450W is the former location of five underground storage tanks (USTs) reportedly used for the storage of waste oil and PD-680. The USTs were removed during the Navy's tank removal and replacement program, which was conducted in 1989 and 1990. Two of the USTs were replaced and are currently present at the site.

A contamination assessment (CA) investigation was conducted by ABB Environmental Services Inc. (ABB-ES) at Site 3450W from February to April 1992. Five monitoring wells were installed at the site (see Executive Summary Figure). Groundwater samples were collected on February 24, 1992, and analyzed for used oil constituents. A contamination assessment report (CAR) was submitted in August 1992. Because analytical data indicated that petroleum contaminants at the site were minimal, a *No Further Action Proposal (NFAP)* was submitted. Although minimal petroleum contamination was found, this proposal was rejected by the Florida Department of Environmental Regulation (FDER) because of the presence of 1,1-dichloroethane (1,1-DCA) in samples collected from all monitoring wells.

An additional field investigation was performed during January 1993. To fulfill FDER requirements, a deep monitoring well was installed and sampled to assess the vertical extent of 1,1-DCA contamination. Additionally, the five previously installed shallow wells were sampled and analyzed for volatile organics by U.S. Environmental Protection Agency (USEPA) Method 601 to confirm the persistence of 1,1-DCA in the groundwater.

### Findings

- Laboratory analyses of groundwater samples indicate a continued persistence of 1,1-DCA in groundwater at Site 3450W. 1,1-DCA was detected in samples collected from all site monitoring wells, at concentrations ranging from 12 parts per billion (ppb) in PEN-3450W-MW1 and PEN-3450W-MW5, to 76 ppb in PEN-3450W-MW3 (see Executive Summary Figure). The concentrations of 1,1-DCA, however, are below the State recommended guideline concentration of 2,400 ppb (FDER, February 1989).
- Trichloroethene (TCE) was detected in samples collected from four site wells. The highest concentrations, 4 ppb, were detected in samples from monitoring wells PEN-3450W-MW2 and PEN-3450W-MW6D. This concentration slightly exceeds the State recommended guidance concentration of 3 ppb for TCE.
- Tetrachloroethene (PCE) was detected in the groundwater sample collected from the deep well (PEN-3450W-MW6D), at a concentration of 4 ppb, which is slightly above the State recommended guidance concentration of 3 ppb for PCE.
- 1,1-Dichloroethene (1,1-DCE) was detected in the groundwater samples collected from all monitoring wells. 1,1-DCE was not detected during the previous sampling event. A concentration of 11 ppb was detected in the

sample from the deep well (PEN-3450W-MW6D), which was the only sample containing a concentration above the State recommended guidance concentrations of 7 ppb.

- Chloroform, 1,1,1-trichloroethane (1,1,1-TCA), and 1,2-Dichloroethene (1,2-DCE) were detected in samples from several monitoring wells. Their concentrations were below State recommended guidance concentrations.

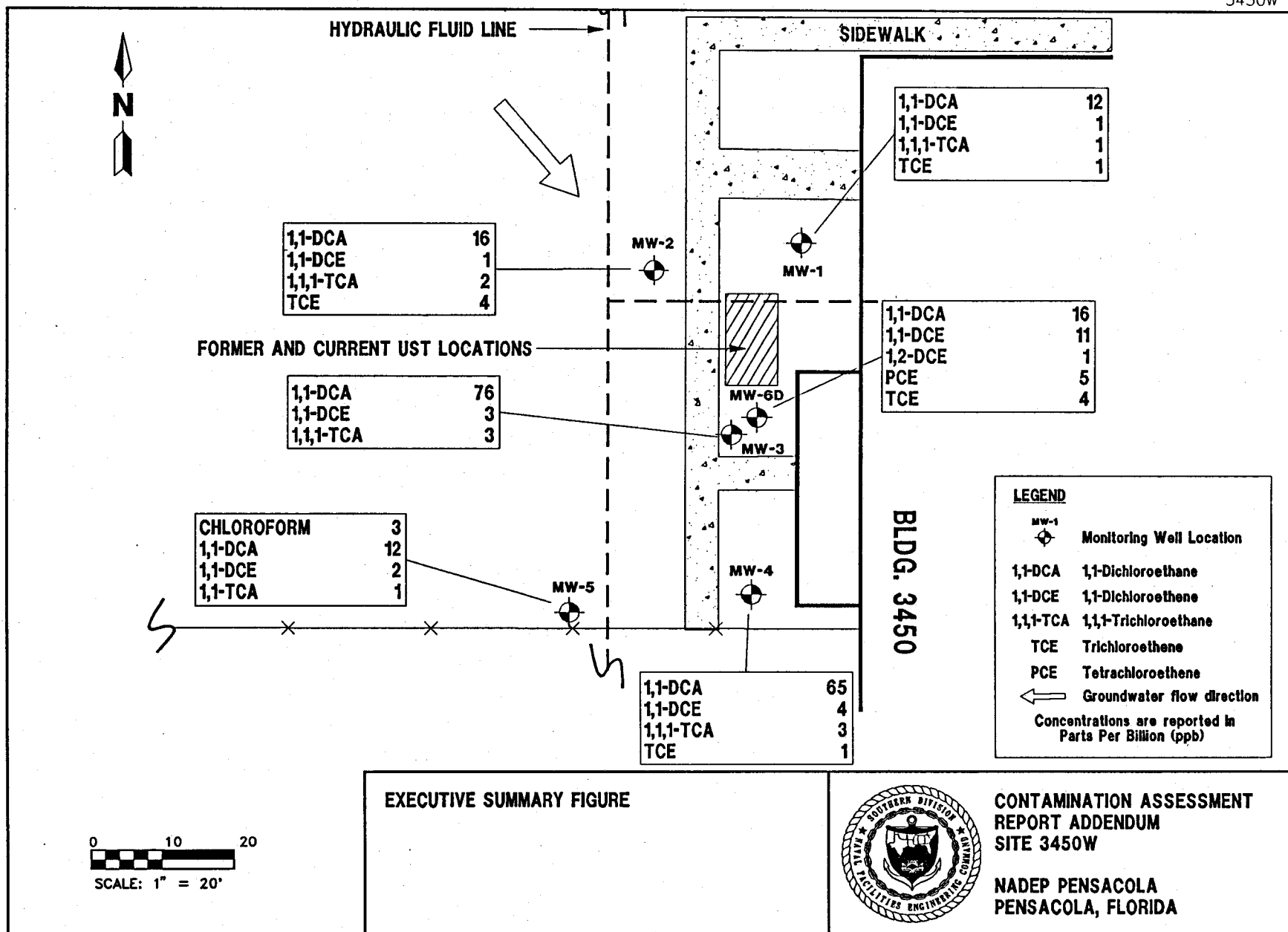
### Conclusions

Groundwater petroleum contamination appears to be minimal. 1,1-DCA appears to be persistent in the groundwater at the site; however, 1,1-DCA concentrations are well below State recommended guidance concentrations. Because 1,1-DCA was detected in the sample collected from the deep monitoring well (PEN-3450W-MW6D), the vertical extent of 1,1-DCA contamination has not been delineated. In addition, the vertical extent of other chlorinated solvents has not been delineated. Concentrations of 1,1-DCE, TCE, and PCE were slightly above State recommended guidance concentrations. The source for these groundwater contaminants is currently unknown. Because petroleum groundwater contamination is minimal, the source does not appear to be the USTs at Site 3450W.

### Recommendations

Based on the findings and conclusions discussed above, a NFAP is recommended for the petroleum USTs at Site 3450W. Additional investigation of the 1,1-DCA, TCE, PCE, and 1,1-DCE contamination should be performed in conjunction with the investigation at Site 30, which is being conducted under the guidelines of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).





## ACKNOWLEDGMENTS

In preparing this report, The Underground Storage Tank Section of the Comprehensive Long-Term Environmental Action, Navy (CLEAN) Group at ABB Environmental Services, Inc. (ABB-ES), commends the support, assistance, and cooperation provided by the personnel of the Naval Aviation Depot (NADEP), Pensacola, Florida, and Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM). In particular, ABB-ES acknowledges the effort provided by the following people during the investigation and preparation of this report.

Name	Title	Position	Location
Luis Vazquez	Environmental Engineer	Engineer-in-Charge	SOUTHNAVFACENGCOM
Danny Freeman	Environmental Coordinator	Environmental Coordinator	NADEP Pensacola

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NADEP Pensacola, Florida

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Site 3450W,  
NADEP Pensacola, Florida

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## GLOSSARY

The following list contains many of the acronyms, abbreviations, and units of measure used in this report.

ABB-ES	ABB Environmental Services, Inc.
bls	below land surface
1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethene
1,2-DCE	1,2-dichloroethene
CA	contamination assessment
CAP	contamination assessment plan
CAR	contamination assessment report
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action, Navy
CompQAP	Comprehensive Quality Assurance Plan
CTO	Contract Task Order Number
FAC	Florida Administrative Code
FDER	Florida Department of Environmental Regulation
NADEP	Naval Aviation Depot
NAS	Naval Air Station
NFAP	No Further Action Proposal
MW	monitoring well
OVA	organic vapor analyzer
PCE	tetrachloroethene
POA	plan of action
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
SB	soil boring
SDWA	Solid Waste Disposal Act
SOUTHNAVFACENGCOM	Southern Division, Naval Facilities Engineering Command
1,1,1-TCA	1,1,1-trichloroethane
TCE	trichloroethene
TRPH	total recoverable petroleum hydrocarbons

GLOSSARY (Continued)

USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VOA	volatile organic aromatics
VOC	volatile organic compounds

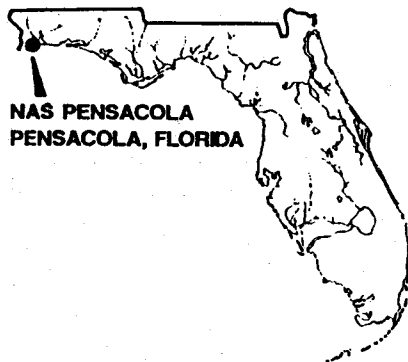
## 1.0 INTRODUCTION

The Naval Aviation Depot (NADEP) Pensacola, Florida, is a tenant command located on Naval Air Station (NAS) facilities within the Pensacola Naval Base Complex. The Pensacola Naval Base Complex is located on the western edge of Pensacola Bay on State Route 295 (Navy Boulevard; Figure 1-1). NADEP Pensacola occupies approximately 130 acres at NAS Pensacola. The mission of NADEP Pensacola is to: maintain and operate facilities for, and perform a complete range of depot-level rework operations on designated weapons systems, accessories, and equipment; manufacture parts and assemblies, as required; provide engineering services in hardware design; furnish technical services on aircraft maintenance and logistic problems; and perform other levels of aircraft maintenance.

During a tank removal program implemented by the U.S. Department of the Navy in 1989 and 1990, petroleum underground storage tanks (USTs) at various NADEP site locations were removed. In many cases, these tanks were replaced with new USTs. Tank contents were reportedly restricted to petroleum products ranging from waste oil, diesel fuel, and unleaded gasoline to PD-680 (a petroleum distillate solvent similar to mineral spirits). The reported volumes of the tanks varied from 500 to 3,000 gallons. Soil samples were collected from each tank excavation and analyzed for total recoverable petroleum hydrocarbons (TRPH). Based on TRPH concentrations, 18 sites were found to be non-compliant with Florida Department of Environmental Regulation (FDER) target levels, as defined in Chapter 17-770, Florida Administrative Code (FAC).

ABB Environmental Services, Inc. (ABB-ES), was contracted by Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform a contamination assessment (CA) and submit a contamination assessment report (CAR) for each of the 18 petroleum contaminated sites at NADEP. The CA at one of the 18 sites, Site 3450W, was conducted from February 1992 through April 1992. The scope of services is described in contract task order (CTO) No. 008, the plan of action (POA), and the contamination assessment plan (CAP).

A CAR for Site 3450W was submitted to FDER in August 1992. At the request of FDER, a supplemental field investigation was performed, which was conducted on January 15 and 16, 1993. This report is an addendum to the original CAR, and presented the findings and conclusions of the supplemental field investigation.



NAS PENSACOLA  
PENSACOLA, FLORIDA

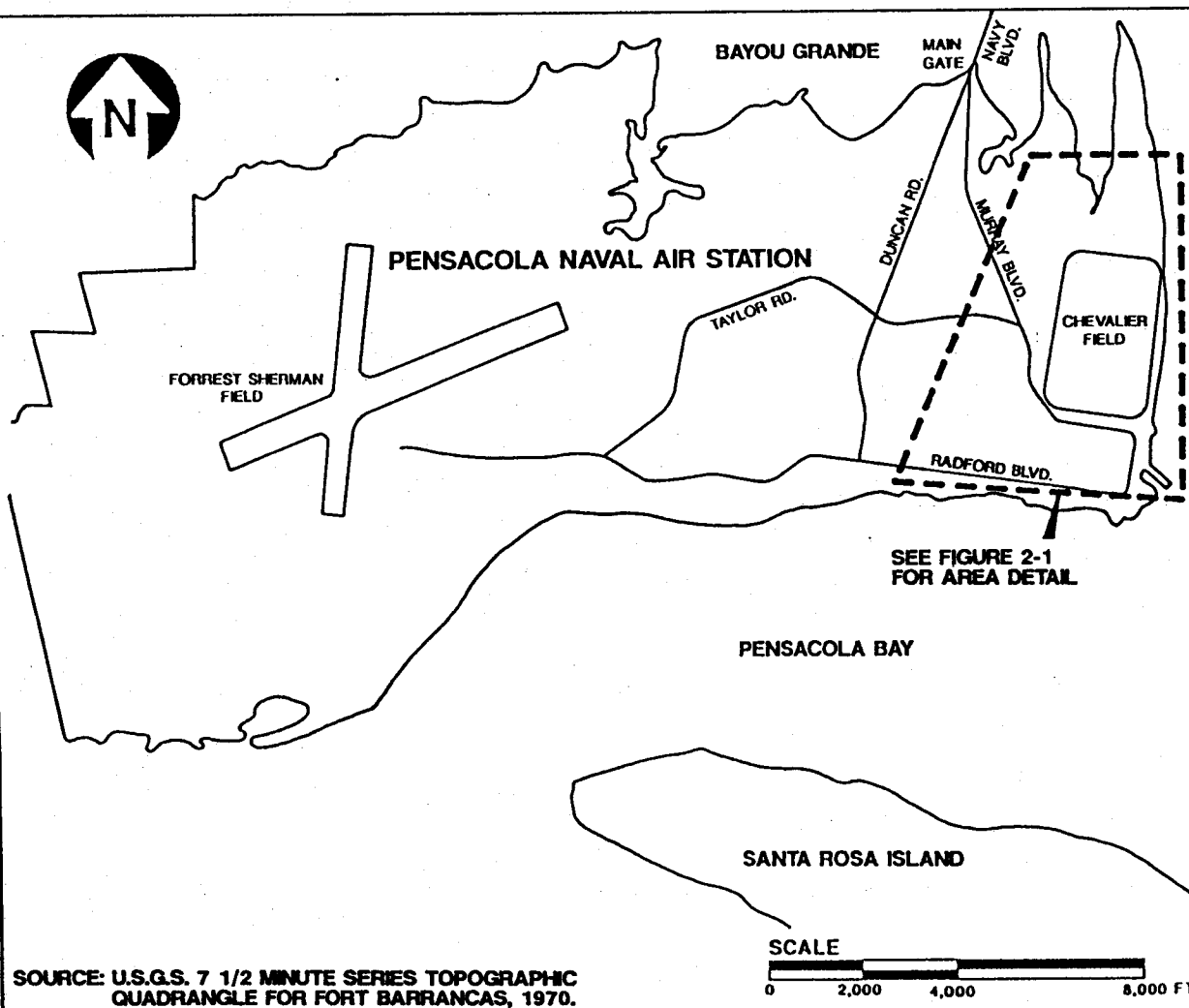
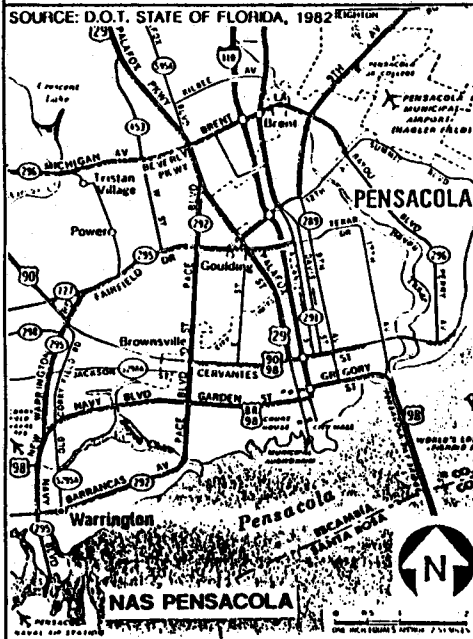


FIGURE 1-1  
FACILITY LOCATION MAP



CONTAMINATION ASSESSMENT  
REPORT ADDENDUM  
SITE 3450W  
NADEP PENSACOLA  
PENSACOLA, FLORIDA



## 2.0 SITE BACKGROUND

2.1 SITE DESCRIPTION. Building 3450 is located several hundred feet west of the northwest part of Chevalier field on Farrar Road (Figure 2-1). It is a dynamic components facility where various helicopter parts are repaired.

Site 3450W, located along the western side of Building 3450 (Figure 2-2), is the former location of five USTs reportedly used for the storage of waste oil and PD-680, a petroleum distillate similar to mineral spirits. Presently, there are two USTs at the site. Site 3450W is grassed in the immediate UST vicinity. The area immediately west of the site is an asphalt-covered parking lot.

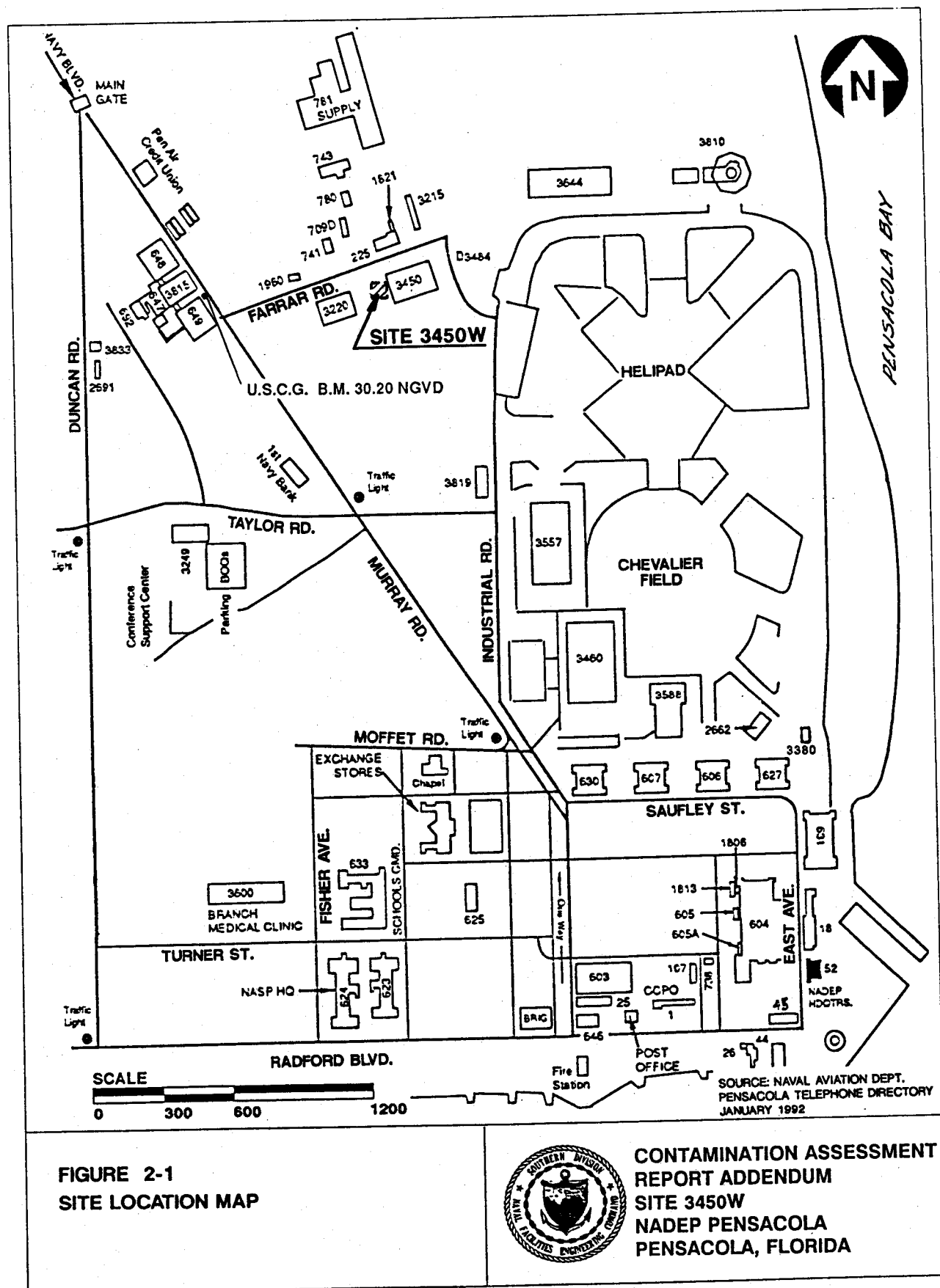
2.2 SITE HISTORY. The five USTs were installed at Site 3450W in 1980. The USTs were removed from the site during the Navy tank removal and replacement program, conducted in 1989 and 1990. The USTs were replaced with two new USTs, which are also used for the storage of waste oil and PD-680. During the tank removal program, a composite soil sample was collected from each former UST excavation and analyzed for TRPH. The reported TRPH concentrations of 80 to 330 parts per million (ppm) exceeded the State target level of 50 ppm for petroleum-contaminated soils (FDER, May 1992).

Previous Site Investigation. A CA investigation was conducted by ABB-ES at Site 3450W from February to April 1992. During this assessment, five monitoring wells (PEN-3450W-MW1 through PEN-3450W-MW5) were installed. Monitoring well locations are shown in Figure 2-2.

Groundwater samples were collected from the five monitoring wells on February 24, 1992. Samples were submitted to Wadsworth/ALERT Laboratories, Tampa, Florida, and analyzed for used oil constituents as defined in Chapter 17-770, FAC. A contamination assessment report (CAR) was submitted to FDER in August 1992. The results of the CAR are summarized below.

- The groundwater flow direction at the site is toward the southeast.
- Methylene chloride, 1,1-dichloroethane (1,1-DCA), 1,1,1-trichloroethane (1,1,1-TCA), trichloroethene (TCE), and bis(2-ethylhexyl)phthalate were identified in groundwater samples collected from site monitoring wells. Methylene chloride was detected in the equipment blank, indicating that its presence in groundwater samples is the result of laboratory contamination. Concentrations of 1,1-DCA, 1,1,1-TCA, TCE, and bis(ethylhexyl)phthalate did not exceed State recommended guidance concentrations (FDER, February 1989).

A *No Further Action Proposal (NFAP)* was submitted in the CAR. Because a source for the 1,1-DCA and other chlorinated solvents contamination was not identified, FDER requested that an additional field investigation be conducted at the site (as outlined in the FDER Interoffice Memorandum from Jorge Caspary to Eric Nuzie, dated September 30, 1992). A copy of this correspondence is attached in Appendix A. The purpose of the supplemental investigation was to confirm the persistence of 1,1-DCA groundwater contamination and to assess the vertical extent of this contamination.



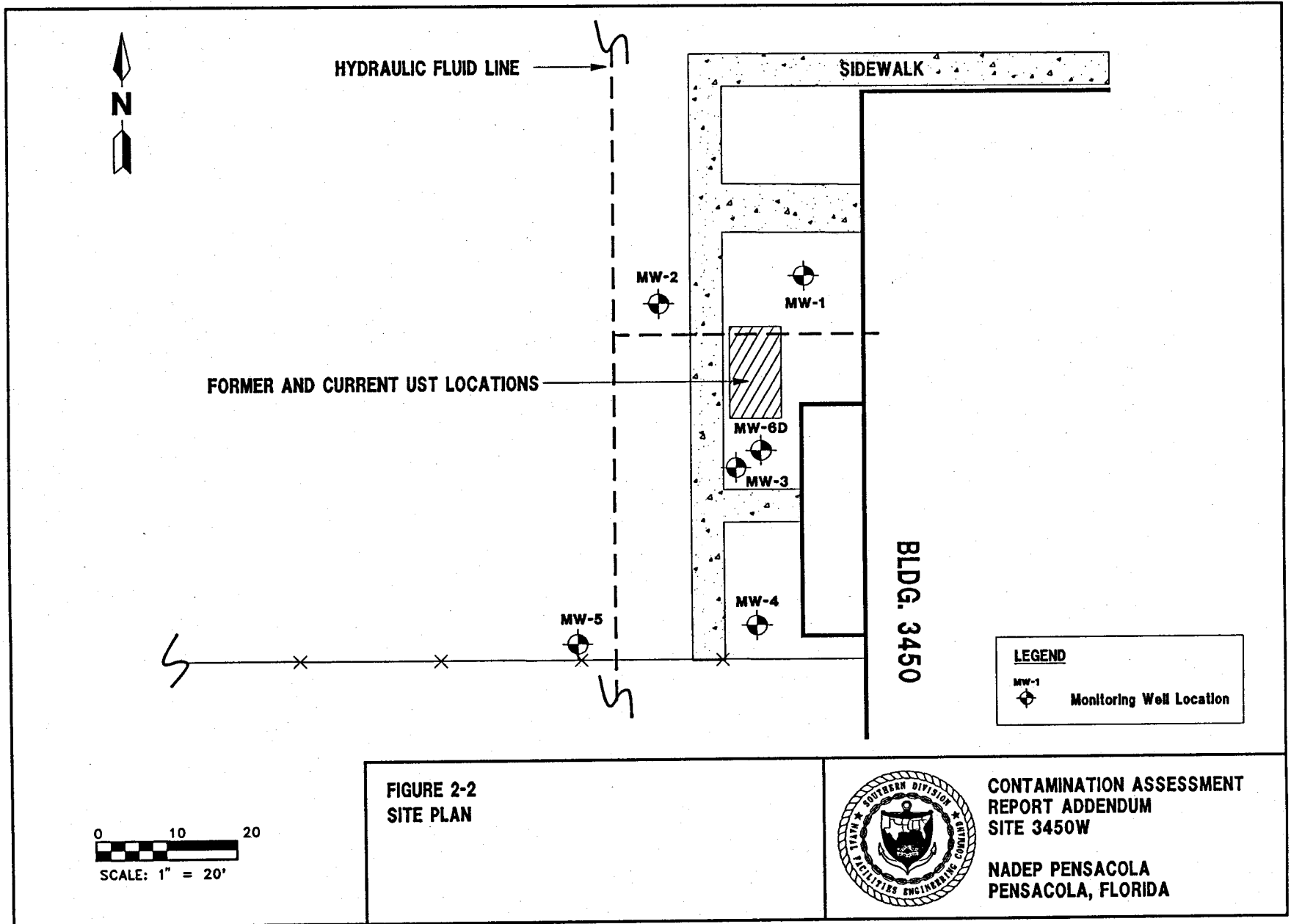


FIGURE 2-2  
SITE PLAN



CONTAMINATION ASSESSMENT  
REPORT ADDENDUM  
SITE 3450W

NADEP PENSACOLA  
PENSACOLA, FLORIDA

This CAR addendum incorporates the findings and conclusions of the supplemental groundwater assessment with the findings and conclusions of the original CAR.

2.3 SCOPE. The scope of services developed to perform the additional field work included:

- installation of one deep monitoring well (PEN-3450W-MW6D) to a depth of 42 feet below land surface (bls),
- collection of groundwater samples from all site monitoring wells for analysis of volatile organic compounds by U.S. Environmental Protection Agency (USEPA) Method 601, and
- reduction and analysis of all data gathered during the field investigation to prepare this CAR addendum.

### 3.0 SUPPLEMENTAL GROUNDWATER ASSESSMENT RESULTS

#### 3.1 METHODOLOGIES AND EQUIPMENT.

3.1.1 Monitoring Well Installation PEN-3450W-MW6D was installed to a depth of 42 feet bls. The well is constructed of 2-inch inner diameter, schedule 40, polyvinyl chloride (PVC) casing with flush-threaded joints and 5 feet of 0.010-inch machine-slotted screen. The screened interval is from 37 to 42 feet bls. PVC well casing extends from the top of the screen to land surface. A 20/30 grade silica sand filter pack was placed in the annular space to approximately 2 to 3 feet above the top of the screen. A 2-foot thick bentonite seal was then placed on top of the filter pack. The remaining annular space was grouted to the surface with a neat cement grout.

3.1.2 Groundwater Sampling Groundwater samples were collected in accordance with ABB-ES' FDER-approved Comprehensive Quality Assurance Plan (CompQAP). The monitoring wells were purged with a Teflon™ bailer. Purging continued until five well volumes had been removed from each well. Groundwater samples were collected using an extruded Teflon™ bailer. The samples were placed into appropriate containers, properly preserved, placed on ice, and shipped to Wadsworth/ALERT Laboratories in Tampa, Florida.

3.2 GROUNDWATER SAMPLING RESULTS. Water level measurements were recorded from each shallow monitoring well on January 15, 1993. A water level elevation contour map was constructed (Figure 3-1) and indicates that groundwater is flowing to the southeast, which is consistent with the previous investigation (ABB-ES, 1992).

Groundwater samples were collected from each shallow monitoring well on January 15, 1993. The deep well was sampled on January 16, 1993. The samples were analyzed for volatile organics by USEPA Method 601. A duplicate sample, laboratory blanks, equipment blank, and a trip blank were also analyzed with the monitoring well samples. Laboratory groundwater analytical results are presented in Appendix B and are summarized in Table 3-1 and Figure 3-2.

1,1-DCA and 1,1-dichloroethene (1,1-DCE) were detected in samples collected from each monitoring well. 1,1-DCA concentrations ranged from 12 parts per billion (ppb), detected in samples from PEN-3450W-MW1 and PEN-3450W-MW5, to 76 ppb detected in PEN-3450W-MW3. These concentrations are below the State recommended guidance concentration of 2,400 ppb (FDER, February 1989). 1,1-DCE concentrations exceeded the State recommended guidance concentration of 7 ppb in only the sample collected from well PEN-3450W-MW6D. A concentration of 11 ppb was detected in the sample from this well.

1,1-Trichloroethane (1,1,TCA) was detected in the samples collected from every well except PEN-3450W-MW6D. The concentrations varied from 1 ppb to 3 ppb, which are well below the State recommended guidance concentration of 200 ppb for 1,1-TCA.

Chloroform was detected in only the sample collected from well PEN-3450W-MW5, at a concentration of 3 ppb, which is well below the State recommended guidance concentration of 100 ppb for chloroform.

1,2-Dichloroethene (1,2-DCE) was detected in only the sample collected from well PEN-3450W-MW6D. The concentration of 1 ppb is below the State recommended guidance concentration of 4.2 ppb for 1,2-DCE.

TCE was detected in samples collected from four wells. The concentrations in samples collected from wells PEN-3450W-MW2 and PEN-3450W-MW6D were 4 ppb, which slightly exceed the State recommended guidance concentration of 3 ppb.

Tetrachloroethene (PCE) was detected in only the sample collected from PEN-3450W-MW6D. The PCE concentration of 5 ppb slightly exceeds the State recommended guidance concentration of 3 ppb.

No contaminants were detected in the method blanks associated with the sampling event.

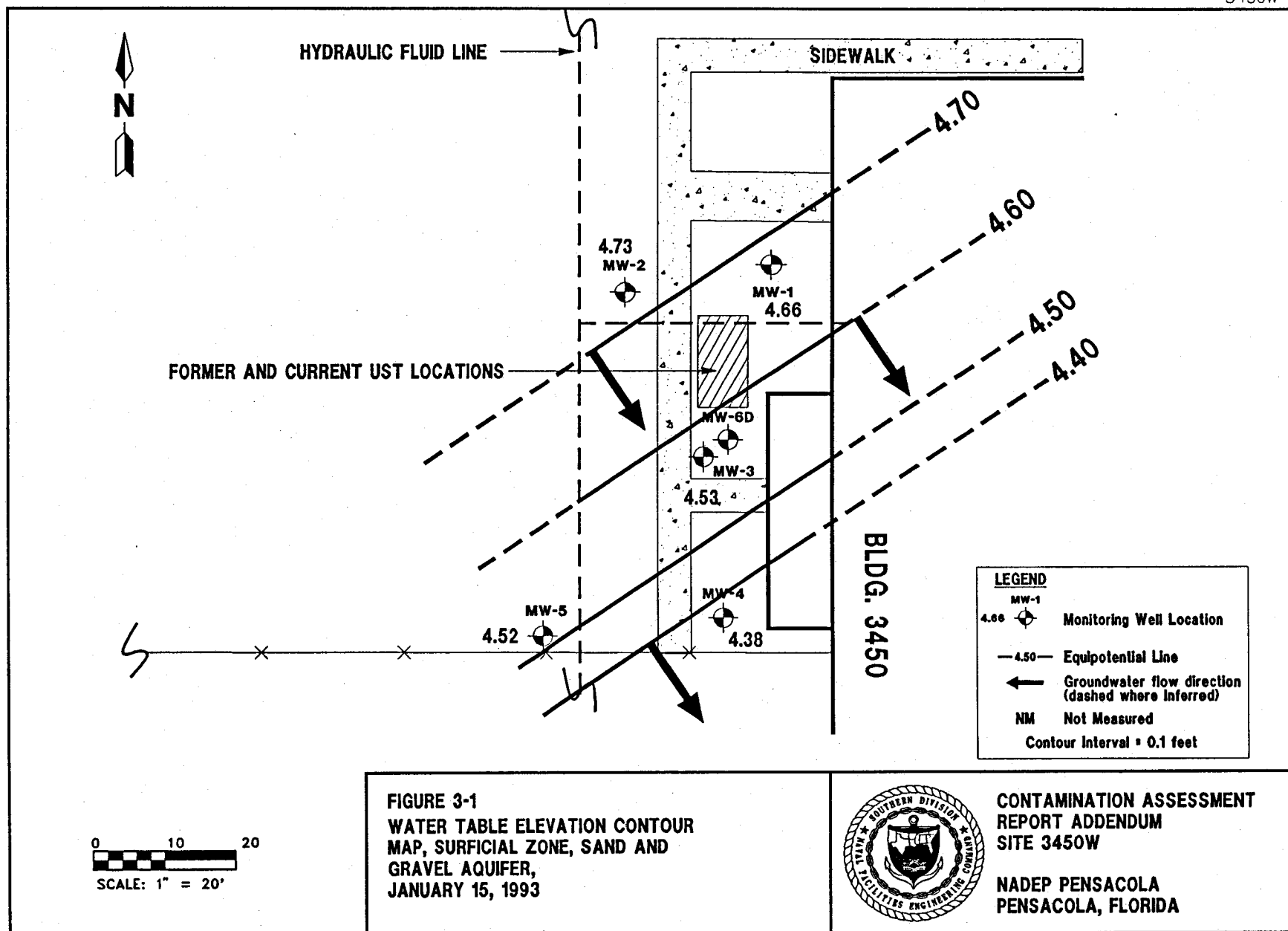
**Table 3-1**  
**Groundwater Sample Laboratory Analyses Results,**  
**January 15 and 16, 1993**

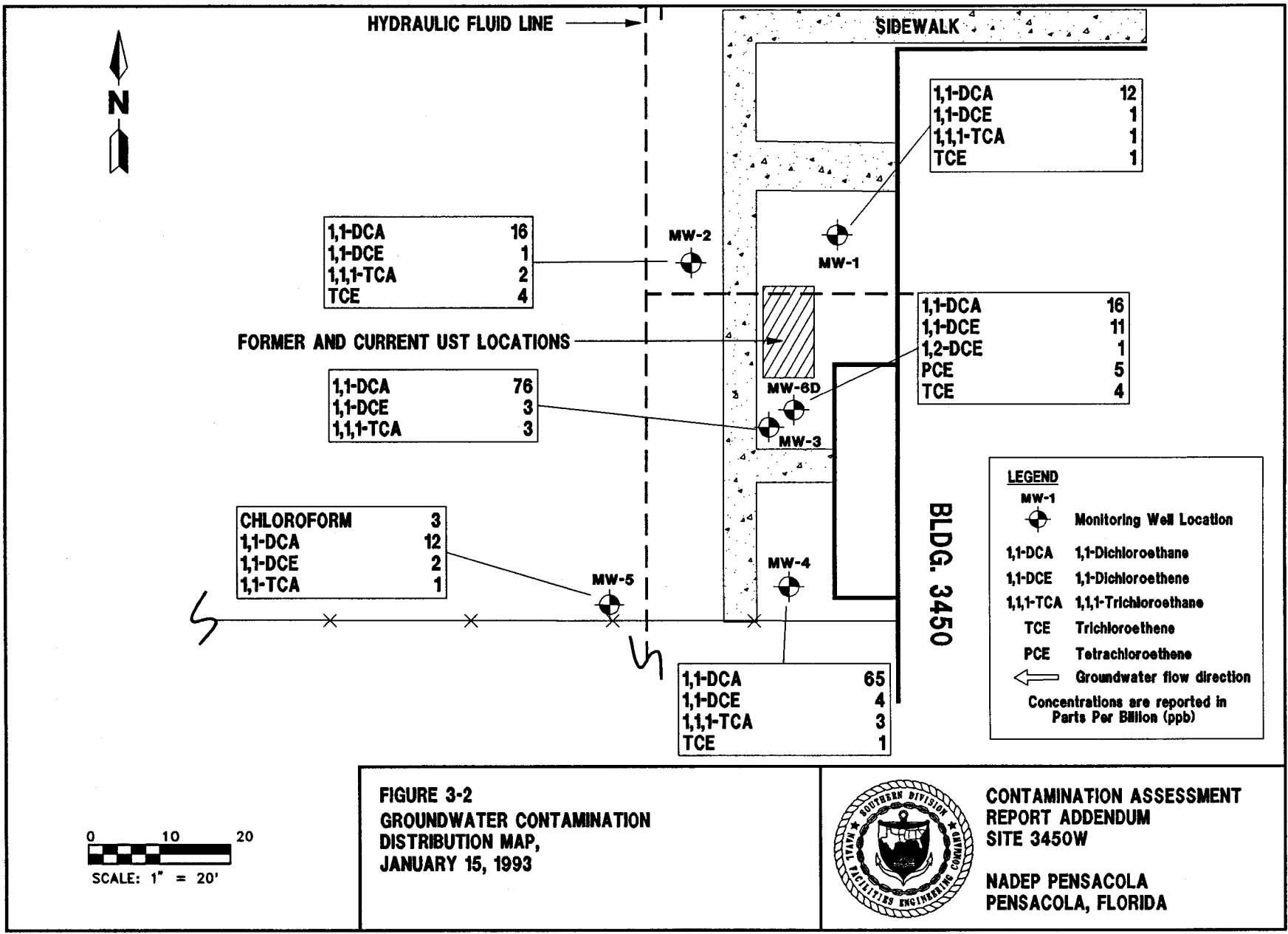
Contamination Assessment Report Addendum  
Site 3450W, Naval Aviation Depot  
Pensacola, Florida

Compound	State Regulatory/Guidance Concentrations <sup>1</sup>	MW1	MW2	MW3	MW4	MW4 Duplicate	MW5	MW6D
Chloroform	100	ND	ND	ND	ND	ND	3	ND
1,1,1,-Trichloroethane	200	1	2	3	3	3	1	ND
1,1-Dichloroethane	2,400	12	16	76	49	65	12	16
1,1-Dichloroethene	7	1	1	3	3	4	2	11
1,2-Dichloroethene	4.2	ND	ND	ND	ND	ND	ND	1
Trichloroethene	3	1	4	ND	1	1	ND	4
Tetrachloroethene	3	ND	ND	ND	ND	ND	ND	5

<sup>1</sup> Guidance concentration recommended by Florida Department of Environmental Regulation (FDER), February 1989.

Notes: All concentrations reported in parts per billion.  
Duplicate sample was collected from monitoring well MW4.  
ND = not detected.







#### 4.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

4.1 SUMMARY. The following is a summary of the conditions observed at the site.

- Laboratory analyses of groundwater samples collected in January 1993 indicate that 1,1-DCA groundwater contamination is persistent at the site. 1,1-DCA concentrations were detected in samples from all site monitoring wells, ranging from 12 ppb to 76 ppb. The concentrations of 1,1-DCA are well below the State recommended guideline concentration of 2,400 ppb.
- 1,1-DCA was also detected in the deep well, PEN-3450W-MW6D.
- 1,1-DCE was detected in the groundwater samples collected from all monitoring wells during the 1993 sampling event. It was not detected in the 1992 groundwater samples. The only sample that contained a concentration above the State recommended guidance concentration was collected from PEN-3450W-MW6D.
- The highest concentrations of TCE, 4 ppb, were found in samples from monitoring wells PEN-3450W-MW2 and PEN-3450W-MW6D. These slightly exceed the State recommended guidance concentration of 3 ppb for TCE.
- PCE was detected in only the sample from PEN-3450W-MW6D at a concentration of 5 ppb. This exceeds the State recommended guidance concentration of 3 ppb for PCE.

4.2 CONCLUSIONS. Groundwater petroleum contamination appears to be minimal. 1,1-DCA appears to be persistent in the groundwater at the site; however, 1,1-DCA concentrations are well below State recommended guidance concentrations. Because 1,1-DCA was detected in the sample collected from the deep monitoring well (PEN-3450W-MW6D), the vertical extent of 1,1-DCA contamination has not been delineated. In addition, the vertical extent of other chlorinated solvents has not been delineated. Concentrations of 1,1-DCE, TCE, and PCE were slightly above State recommended guidance concentrations. The source for these groundwater contaminants is currently unknown. Because petroleum groundwater contamination is minimal, the source does not appear to be the USTs at Site 3450W. None of the groundwater contaminants appear to be petroleum-derived, and it does not appear likely that the USTs at Site 3450W are the source of contamination.

4.3 RECOMMENDATIONS. Based on the findings and conclusions discussed above, a NFAP is recommended for the petroleum USTs at Site 3450W. Additional investigation of the 1,1-DCA, TCE, PCE, and 1,1-DCE contamination should be performed in conjunction with the investigation at Site 30, which is being conducted under the guidelines of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

## 5.0 PROFESSIONAL REVIEW CERTIFICATION

The contamination assessment contained in this report was prepared using sound hydrogeologic principles and judgment. This assessment is based on the geologic investigation and associated information detailed in the text and appended to this report. If conditions are determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of any additional information on the assessment described in this report. This Contamination Assessment Report Addendum was developed for the USTs located at Site 3450W at the Naval Aviation Depot, Naval Air Station, Pensacola, Florida, and should not be construed to apply to any other site.

---

Roger Durham  
Professional Geologist  
P.G. No. 001127

---

Date

## 6.0 REFERENCES

- ABB Environmental Services, Inc., 1992, Contamination Assessment Report, Site 3450W, Naval Aviation Depot, Naval Air Station, Pensacola, Florida: Prepared for Southern Division, Naval Facilities Engineering Command, Charleston, South Carolina.
- Florida Department of Environmental Regulation, February 1989, Groundwater guidance concentrations: compiled by R. Merchant, Division of Water Facilities, 14 p.
- Florida Department of Environmental Regulation, May 1992, Guidelines for Assessment and Remediation of Petroleum Contaminated Soils, revised: Division of Waste Management, 39 p.
- Florida Department of Transportation, 1982, Florida official transportation map: 1 sheet.
- Naval Aviation Depot, Pensacola, 1992, Telephone Directory, 32 p.
- U.S. Geological Survey, 1970, Fort Barrancas Quadrangle, 7.5-minute topographic series.

**APPENDIX A**  
**FDER Correspondence**



State of Florida  
DEPARTMENT OF ENVIRONMENTAL REGULATION

For Routing To Other Than The Addressee	
To:	Location:
To:	Location:
To:	Location:
From:	Date:

# Interoffice Memorandum

TO: Eric S. Nuzie, Federal Facilities Coordinator  
Bureau of Waste Cleanup.

THROUGH: Dr. James J. Crane, PGIII/Administrator  
Technical Review Section *JRC*

FROM: Jorge R. Caspary, P.G. Base Coordinator  
Technical Review Section *JRC*

DATE: September 30, 1992

SUBJECT: Review of Contamination Assessment Report for Site 3450  
West, Naval Aviation Depot. Pensacola Naval Air  
Station.

I have reviewed the Contamination Assessment Report (CAR) dated August, 1992 (received August 24, 1992), submitted for this site. In order to meet the requirements of Chapter 17-770, Florida Administrative Code (F.A.C.), the following comments need to be addressed:

- 1) Based on the persistence of 1,1-Dichloroethane throughout the site, monitoring wells 1 through 5 should be resampled and analyzed for EPA Method 601. If the presence of 1,1 Dichloroethane is confirmed, then the Navy and its consultant should investigate the possibility of a source of chlorinated solvents other than the hydraulic fluid line and the UST location.
- 2) If a different source cannot be established, then a vertical extent monitoring well should be installed approximately 15 feet south of MW-2 with a screened interval between 35 and 40 feet below land surface. This monitoring well should be sampled and analyzed for EPA method 601.

Please provide the results of the supplemental assessment to Eric S. Nuzie, Federal Facilities Coordinator within sixty (60) days of receipt of this request. If additional time is needed, a time extension request should be submitted, in accordance with Rule 17-770.800(6), F.A.C. If you should have any questions concerning this review, please contact me at (904) 488-0190.

Eric S. Nuzie  
September 30, 1992  
Page Two

Please note, all supplemental contamination assessment related documents should be signed and sealed by a registered professional in accordance with Rule 17-770.500, F.A.C. The certification should be made by a registered professional who is able to demonstrate competence in the subject area(s) addressed within the sealed document.

**APPENDIX B**  
**Analytical Data**



**WADSWORTH/ALERT Laboratories**  
*Division of Enseco Incorporated*

5910 Breckenridge Parkway, Suite H  
Tampa, FL 33610

813-621-0784  
FAX 813-623-6021

**ANALYTICAL REPORT**

**SUBCONTRACT NUMBER: SE1-08-134**

**TASK ORDER NUMBER: 28**

**NADEP PENSACOLA**

**Presented to:**

**ROGER DURHAM**

**ABB ENVIRONMENTAL SERVICES, INC.**

**ENSECO-WADSWORTH/ALERT LABORATORIES**

**5910 BRECKENRIDGE PARKWAY, SUITE H**

**TAMPA, FL 33610**

**(813) 621-0784**

*Joanne Anderson*  
**Joanne Anderson**  
**Project Manager**

*Randall C. Grubbs*  
**Randall C. Grubbs**  
**Laboratory Director - Florida**

**January 27, 1993**





ENSECO-WADSWORTH/ALERT  
Laboratories

#### INVOLVEMENT

This report summarizes the analytical results of the NADEP Pensacola site submitted by ABB Environmental Services, Inc. to Enseco-Wadsworth/ALERT Laboratories who provided independent, analytical services for this project under the direction of Roger Durham. The samples were accepted into Wadsworth's Florida facility on 19 January 1993, in accordance with documented sample acceptance procedures. The associated analytical methods and sample results are outlined sequentially in this report.

Analytical results included in this report have been reviewed for compliance with the Laboratory QA/QC Plan as summarized in the Quality Control Section at the rear of the report. Sample custody documentation describing the number of samples and sample matrices is also included. Any qualifications and/or non-compliant items have been noted below.



ENSECO-WADSWORTH/ALERT  
Laboratories

### ANALYTICAL METHODS

Wadsworth/ALERT Laboratories utilizes only USEPA approved analytical methods and instrumentation. The analytical methods utilized for the analysis of these samples are listed below.

#### PARAMETER

#### METHOD

#### ORGANICS

Volatile Organics

\*\* EPA Method 601

#### MISCELLANEOUS

Tot. Rec. Petroleum Hydrocarbons  
Extraction

\*\* SW846 Method 9073  
\*\* SW846 Method 9071

NOTE: \*\* Indicates usage of this method to obtain results for this report.

(D) Indicates draft version of this method was used

EPA Methods Methods for Chemical Analysis of Water and Wastes, USEPA, 600/4-79-020, March, 1983. July, 1982

Std. Methods Drinking Waters USEPA, 600/4-88/039, December, 1988.

USEPA Methods Standard Methods for the Examination of Water and Waste-water, APHA, 16th edition, 1985.

SW846 Methods From 40CFR Part 136, published in Federal Register on October 26, 1984.

ASTM Methods Test Methods for Evaluating Solid Waste Physical/Chemical Methods, 3rd Edition, USEPA, 1986.

NIOSH Method American Society for Testing and Materials.

NIOSH Manual of Analytical Methods, National Institute for Occupational Safety and Health, 2nd Edition, April 1977.



ENSECO-WADSWORTH/ALERT  
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 3A1902-5  
MATRIX: WATER

DATE RECEIVED: 1/19/93  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/23/93

SAMPLE ID: PEN-3450W-MW1

PROJ #3450W

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601 - GC

Bromodichloromethane	ND	1,2-Dichloroethane	ND
Bromoform	ND	1,1-Dichloroethene	1
Bromomethane	ND	1,2-Dichloroethene (Total)	ND
Carbon tetrachloride	ND	1,2-Dichloropropane	ND
Chlorobenzene	ND	cis-1,3-Dichloropropene	ND
Chloroethane	ND	trans-1,3-Dichloropropene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	1,1,1-Trichloroethane	1
1,2-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,3-Dichlorobenzene	ND	Trichloroethene	1
1,4-Dichlorobenzene	ND	Trichlorofluoromethane	ND
Dichlorodifluoromethane	ND	Vinyl chloride	ND
1,1-Dichloroethane	12		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 1 ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY: %  
Bromochloromethane (HECD) 93

ACCEPTABLE LIMITS  
(78-122)



ENSECO-WADSWORTH/ALERT  
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 3A1902-4  
MATRIX: WATER

DATE RECEIVED: 1/19/93  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/23/93

SAMPLE ID: PEN-3450W-MW2

PROJ #3450W

VOLATILE ORGANICS  
METHOD 601 - GC

CERTIFICATION #: E84059  
HRS84297

Bromodichloromethane	ND	1,2-Dichloroethane	ND
Bromoform	ND	1,1-Dichloroethene	1
Bromomethane	ND	1,2-Dichloroethene (Total)	ND
Carbon tetrachloride	ND	1,2-Dichloropropane	ND
Chlorobenzene	ND	cis-1,3-Dichloropropene	ND
Chloroethane	ND	trans-1,3-Dichloropropene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	1,1,1-Trichloroethane	2
1,2-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,3-Dichlorobenzene	ND	Trichloroethene	4
1,4-Dichlorobenzene	ND	Trichlorofluoromethane	ND
Dichlorodifluoromethane	ND	Vinyl chloride	ND
1,1-Dichloroethane	16		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY: %  
Bromochloromethane (HECD) 101  
ACCEPTABLE LIMITS  
(78-122)



ENSECO-WADSWORTH/ALERT  
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 3A1902-3  
MATRIX: WATER

DATE RECEIVED: 1/19/93  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/23/93

SAMPLE ID: PEN-3450W-MW3

PROJ #3450W

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601 - GC

Bromodichloromethane	ND	1,2-Dichloroethane	ND
Bromoform	ND	1,1-Dichloroethene	3
Bromomethane	ND	1,2-Dichloroethene (Total)	ND
Carbon tetrachloride	ND	1,2-Dichloropropane	ND
Chlorobenzene	ND	cis-1,3-Dichloropropene	ND
Chloroethane	ND	trans-1,3-Dichloropropene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	1,1,1-Trichloroethane	3
1,2-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,3-Dichlorobenzene	ND	Trichloroethene	ND
1,4-Dichlorobenzene	ND	Trichlorofluoromethane	ND
Dichlorodifluoromethane	ND	Vinyl chloride	ND
1,1-Dichloroethane	76		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 1 ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY: %  
Bromochloromethane (HECD) 100

ACCEPTABLE LIMITS  
(78-122)



ENSECO-WADSWORTH/ALERT  
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 3A1902-2  
MATRIX: WATER

DATE RECEIVED: 1/19/93  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/23/93

SAMPLE ID: PEN-3450W-MW4

PROJ #3450W

VOLATILE ORGANICS  
METHOD 601 - GC

CERTIFICATION #: E84059  
HRS84297

Bromodichloromethane	ND	1,2-Dichloroethane	ND
Bromoform	ND	1,1-Dichloroethene	3
Bromomethane	ND	1,2-Dichloroethene (Total)	ND
Carbon tetrachloride	ND	1,2-Dichloropropane	ND
Chlorobenzene	ND	cis-1,3-Dichloropropene	ND
Chloroethane	ND	trans-1,3-Dichloropropene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	1,1,1-Trichloroethane	3
1,2-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,3-Dichlorobenzene	ND	Trichloroethene	1
1,4-Dichlorobenzene	ND	Trichlorofluoromethane	ND
Dichlorodifluoromethane	ND	Vinyl chloride	ND
1,1-Dichloroethane	49		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 1 ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY: %  
Bromochloromethane (HECD) 107  
ACCEPTABLE LIMITS  
(78-122)



ENSECO-WADSWORTH/ALERT  
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 3A1902-1  
MATRIX: WATER

DATE RECEIVED: 1/19/93  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/23/93

SAMPLE ID: PEN-3450W-MW5

PROJ #3450W

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601 - GC

Bromodichloromethane	ND	1,2-Dichloroethane	ND
Bromoform	ND	1,1-Dichloroethene	2
Bromomethane	ND	1,2-Dichloroethene (Total)	ND
Carbon tetrachloride	ND	1,2-Dichloropropane	ND
Chlorobenzene	ND	cis-1,3-Dichloropropene	ND
Chloroethane	ND	trans-1,3-Dichloropropene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	3	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	1,1,1-Trichloroethane	1
1,2-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,3-Dichlorobenzene	ND	Trichloroethene	ND
1,4-Dichlorobenzene	ND	Trichlorofluoromethane	ND
Dichlorodifluoromethane	ND	Vinyl chloride	ND
1,1-Dichloroethane	12		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 1 ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY: %  
Bromochloromethane (HECD) 97

ACCEPTABLE LIMITS  
(78-122)



ENSECO-WADSWORTH/ALERT  
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 3A1902-6  
MATRIX: WATER

DATE RECEIVED: 1/19/93  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/23/93

SAMPLE ID: PEN-3450W-MW6D

PROJ #3450W

VOLATILE ORGANICS  
METHOD 601 - GC

CERTIFICATION #: E84059  
HRS84297

Bromodichloromethane	ND	1,2-Dichloroethane	ND
Bromoform	ND	1,1-Dichloroethene	11
Bromomethane	ND	1,2-Dichloroethene (Total)	1
Carbon tetrachloride	ND	1,2-Dichloropropane	ND
Chlorobenzene	ND	cis-1,3-Dichloropropene	ND
Chloroethane	ND	trans-1,3-Dichloropropene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	5
Dibromochloromethane	ND	1,1,1-Trichloroethane	ND
1,2-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,3-Dichlorobenzene	ND	Trichloroethene	4
1,4-Dichlorobenzene	ND	Trichlorofluoromethane	ND
Dichlorodifluoromethane	ND	Vinyl chloride	ND
1,1-Dichloroethane	16		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 1 ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY: %  
Bromochloromethane (HECD) 93

ACCEPTABLE LIMITS  
(78-122)





ENSECO-WADSWORTH/ALERT  
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 3A1902-7  
MATRIX: WATER

DATE RECEIVED: 1/19/93  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/23/93

SAMPLE ID: PEN-3450W-DUP

PROJ #3450W

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601 - GC

Bromodichloromethane	ND	1,2-Dichloroethane	ND
Bromoform	ND	1,1-Dichloroethene	4
Bromomethane	ND	1,2-Dichloroethene (Total)	ND
Carbon tetrachloride	ND	1,2-Dichloropropane	ND
Chlorobenzene	ND	cis-1,3-Dichloropropene	ND
Chloroethane	ND	trans-1,3-Dichloropropene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	1,1,1-Trichloroethane	3
1,2-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,3-Dichlorobenzene	ND	Trichloroethene	1
1,4-Dichlorobenzene	ND	Trichlorofluoromethane	ND
Dichlorodifluoromethane	ND	Vinyl chloride	ND
1,1-Dichloroethane	65		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 1 ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY: %  
Bromochloromethane (HECD) 94

ACCEPTABLE LIMITS  
(78-122)



ENSECO-WADSWORTH/ALERT  
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 3A1902-8  
MATRIX: WATER

DATE RECEIVED: 1/19/93  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/23/93

SAMPLE ID: PEN-3450W-EB

PROJ #3450W

VOLATILE ORGANICS  
METHOD 601 - GC

CERTIFICATION #: E84059  
HRS84297

Bromodichloromethane	ND	1,2-Dichloroethane	ND
Bromoform	ND	1,1-Dichloroethene	ND
Bromomethane	ND	1,2-Dichloroethene (Total)	ND
Carbon tetrachloride	ND	1,2-Dichloropropane	ND
Chlorobenzene	ND	cis-1,3-Dichloropropene	ND
Chloroethane	ND	trans-1,3-Dichloropropene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	1,1,1-Trichloroethane	ND
1,2-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,3-Dichlorobenzene	ND	Trichloroethene	ND
1,4-Dichlorobenzene	ND	Trichlorofluoromethane	ND
Dichlorodifluoromethane	ND	Vinyl chloride	ND
1,1-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 1 ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY:  
Bromochloromethane (HECD)

%  
95

ACCEPTABLE LIMITS  
(78-122)



ENSECO-WADSWORTH/ALERT  
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 3A1902-10  
MATRIX: WATER

DATE RECEIVED: 1/19/93  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/23/93

SAMPLE ID: TRIP BLANK

PROJ #3450W

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601 - GC

Bromodichloromethane	ND	1,2-Dichloroethane	ND
Bromoform	ND	1,1-Dichloroethene	ND
Bromomethane	ND	1,2-Dichloroethene (Total)	ND
Carbon tetrachloride	ND	1,2-Dichloropropane	ND
Chlorobenzene	ND	cis-1,3-Dichloropropene	ND
Chloroethane	ND	trans-1,3-Dichloropropene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	1,1,1-Trichloroethane	ND
1,2-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,3-Dichlorobenzene	ND	Trichloroethene	ND
1,4-Dichlorobenzene	ND	Trichlorofluoromethane	ND
Dichlorodifluoromethane	ND	Vinyl chloride	ND
1,1-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 1 ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY: %  
Bromochloromethane (HECD) 96

ACCEPTABLE LIMITS  
(78-122)



ENSECO-WADSWORTH/ALERT  
Laboratories

## QUALITY CONTROL SECTION

- Quality Control Summary
- Laboratory Blanks
- Laboratory Control Sample
- Matrix Spike/Matrix Spike Duplicate Results
- Sample Custody Documentation



ENSECO-WADSWORTH/ALERT  
Laboratories

## QUALITY ASSURANCE / QUALITY CONTROL PROGRAM SUMMARY

Wadsworth/ALERT Laboratories considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with various analytical result reports. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow.

### Surrogate Spike Recovery Evaluations

Known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added, as appropriate, to routine GC and GC/MS sample fractions prior to extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is an indication of the overall method efficiency for the individual sample. This surrogate spike recovery data is displayed alongside acceptable analytical method performance limits at the bottom of each applicable analytical result report sheet.

NOTE: Acceptable method performance for Base/Neutral Acid extractables is indicated by two (2) of three (3) surrogates for each fraction with a minimum recovery of ten (10) percent each. For Pesticides one (1) of two (2) surrogates meeting performance criteria is acceptable.

### Laboratory Analytical Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interferences and background contamination levels associated with each analytical method. These method blanks include all aspects of actual laboratory method analysis (chemical reagents, glassware, etc.), substituting laboratory reagent water or solid for actual sample. The method blank must not contain any analytes above the reported detection limit. The following common laboratory contaminants are exceptions to this rule provided they are not present at greater than five times the detection limit.

#### Volatiles

Methylene chloride  
Toluene  
2-Butanone  
Acetone

#### Semi-volatiles

Dimethyl phthalate  
Diethyl phthalate  
Di-n-butyl phthalate  
Butyl benzyl phthalate  
Bis (2-ethylhexyl) phthalate

#### Metals

Calcium  
Magnesium  
Sodium

A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method blanks.

### Laboratory Analytical Method Check Sample Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to a laboratory reagent blank prior to extraction and analysis. Percent recovery determinations demonstrate the performance of the analytical method. Failure of a check sample to meet established laboratory recovery criteria is cause to stop the analysis until the problem is resolved.



ENSECO-WADSWORTH/ALERT  
Laboratories

QUALITY ASSURANCE / QUALITY CONTROL  
PROGRAM SUMMARY  
(cont'd)

At that time all associated samples must be re-analyzed. A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method check samples.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to two of three separate aliquots of a sequentially predetermined sample prior to extraction and analysis. Percent recovery determinations are calculated from both of the spiked samples by comparison to the actual values generated from the unspiked sample. These percent recovery determinations indicate the accuracy of the analysis at recovering actual analytical method compounds from the matrix. Relative percent difference determinations calculated from a comparison of the MS/MSD recoveries demonstrate the precision of the analytical method. Actual percent recovery and relative percent difference data is displayed alongside their respective acceptable analytical method performance limits in the QA/QC section of the report. The MS/MSD are considered in control when the precision is within established control limits and the associated check sample has been found to be acceptable. A minimum of ten percent (10%) of all analyses are MS/MSD quality control samples.

\*\*\*\*\*EXAMPLE\*\*\*\*\*

COMPOUND	SAMPLE CONC.	MS %REC	MSD %REC	RPD	RPD	QC LIMITS RECOVERY
4,4'-DDT	0	95	112	16	22	66-119
Benzene	10	86	93	8	20	39-150
(cmpd. name)	sample result	1st% recov.	2nd% recov.	Rel.% diff.		accep. method perform range

Analytical Result Qualifiers

The following qualifiers, as defined below, may be appended to analytical results in order to allow proper interpretation of the results presented:

J - indicates an estimated concentration (typically used when a dilution, matrix interference or instrumental limitation prevents accurate quantitation of a particular analyte).

B - indicates the presence of a particular analyte in the laboratory blank analyzed concurrently with the samples. Results must be interpreted accordingly.

DIL - indicates that because of matrix interferences and/or high analyte concentrations, it was necessary to dilute the sample to a point where the surrogate or spike concentrations fell below a quantifiable amount and could not be reported.



ENSECO-WADSWORTH/ALERT  
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 3A1902-BK  
MATRIX: WATER

DATE RECEIVED: 1/19/93  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/22/93

SAMPLE ID: LABORATORY BLANK

PROJ #3450W

CERTIFICATION #: E84059  
HRS84297

VOLATILE ORGANICS  
METHOD 601 - GC

Bromodichloromethane	ND	1,2-Dichloroethane	ND
Bromoform	ND	1,1-Dichloroethene	ND
Bromomethane	ND	1,2-Dichloroethene (Total)	ND
Carbon tetrachloride	ND	1,2-Dichloropropane	ND
Chlorobenzene	ND	cis-1,3-Dichloropropene	ND
Chloroethane	ND	trans-1,3-Dichloropropene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	1,1,1-Trichloroethane	ND
1,2-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,3-Dichlorobenzene	ND	Trichloroethene	ND
1,4-Dichlorobenzene	ND	Trichlorofluoromethane	ND
Dichlorodifluoromethane	ND	Vinyl chloride	ND
1,1-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 1 ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY: %  
Bromochloromethane (HECD) 88

ACCEPTABLE LIMITS  
(78-122)



ENSECO-WADSWORTH/ALERT  
Laboratories

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.  
LAB # 3A1902-BK  
MATRIX: WATER

DATE RECEIVED: 1/19/93  
DATE EXTRACTED: NA  
DATE ANALYZED: 1/23/93

SAMPLE ID: LABORATORY BLANK

PROJ #3450W

VOLATILE ORGANICS  
METHOD 601 - GC

CERTIFICATION #: E84059  
HRS84297

Bromodichloromethane	ND	1,2-Dichloroethane	ND
Bromoform	ND	1,1-Dichloroethene	ND
Bromomethane	ND	1,2-Dichloroethene (Total)	ND
Carbon tetrachloride	ND	1,2-Dichloropropane	ND
Chlorobenzene	ND	cis-1,3-Dichloropropene	ND
Chloroethane	ND	trans-1,3-Dichloropropene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	1,1,1-Trichloroethane	ND
1,2-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,3-Dichlorobenzene	ND	Trichloroethene	ND
1,4-Dichlorobenzene	ND	Trichlorofluoromethane	ND
Dichlorodifluoromethane	ND	Vinyl chloride	ND
1,1-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd  
ND\* (None Detected, lower detectable limit = 1 ug/L) as rec'd  
-- (Not Analyzed)

SURROGATE RECOVERY: %  
Bromochloromethane (HECD) 93

ACCEPTABLE LIMITS  
(78-122)





ENSECO-WADSWORTH/ALERT  
Laboratories

LAB ID : LCS  
MATRIX : WATER  
METHOD : 601/2  
RUN ID : 1A/1B3311

DATE EXTRACTED: N/A  
DATE ANALYZED : 01/22/93

DUPLICATE LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS	LCSD	RPD	QC LIMITS	
		%REC	%REC		RPD	%REC
Benzene	1A/1B3311	104	99	5	15	70-117
Toluene		99	93	6	16	70-117
Chlorobenzene		91	87	4	24	58-133
1,1-Dichloroethene		109	96	13	28	43-131
Trichloroethene		100	93	7	13	75-123
Dichlorobromomethane		105	95	10	22	61-133



ENSECO-WADSWORTH/ALERT  
Laboratories

LAB ID : LCS  
MATRIX : WATER  
METHOD : 601/2  
RUN ID : 1A/1B3344

DATE EXTRACTED: N/A  
DATE ANALYZED : 01/23/93

DUPLICATE LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS	LCS D	RPD	QC LIMITS	
		%REC	%REC		RPD	%REC
Benzene	1A/1B3344	100	100	0	15	70-117
Toluene		98	97	1	16	70-117
Chlorobenzene		91	90	1	24	58-133
1,1-Dichloroethene		92	90	2	28	43-131
Trichloroethene		115	114	1	13	75-123
Dichlorobromomethane		92	96	4	22	61-133



ENSECO-WADSWORTH/ALERT  
Laboratories

LAB ID : LCS  
MATRIX : WATER  
METHOD : 601/2  
RUN ID : 1A/1B3367

DATE EXTRACTED: N/A  
DATE ANALYZED : 01/25/93

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD %REC
Benzene	1A/1B3367	101	15 70-117
Toluene		99	16 70-117
Chlorobenzene		97	24 58-133
1,1-Dichloroethene		102	28 43-131
Trichloroethene		114	13 75-123
Dichlorobromomethane		119	22 61-133



ENSECO-WADSWORTH/ALERT  
Laboratories

LAB ID : 3A1902-5  
MATRIX : WATER  
METHOD : 601/2  
RUN ID : 1A/1B3380/1

DATE RECEIVED : 01/19/93  
DATE PREPARED : N/A  
DATE ANALYZED : 01/25/93

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS	MSD	RPD	QC LIMITS	
		%REC	%REC		RPD	%REC
Benzene	1A/1B3380/1	104	103	1	15	70-117
Toluene		103	100	3	16	70-117
Chlorobenzene		99	98	1	24	58-133
1,1-Dichloroethene		115	88	27	28	43-131
Trichloroethene		110	98	12	13	75-123
Dichlorobromomethane		120	113	6	22	61-133

\* = Diluted Out

**WADSWORTH/ALERT LABORATORIES  
SAMPLE SHIPPER EVALUATION AND RECEIPT FORM**

*Project* 2662W  
3450W  
3557S

Client: ABB Environmental Project Name/Number: NADP Pensacola

Samples Received By: Zack R. [Signature] Date Received: 1/19/93  
(Signature)

Sample Evaluation Form By: Zack R. [Signature] LAB No: 341902 - 1 to 16  
(Signature)

Type of shipping container samples received in? WAL Cooler ✓  
Client Cooler      WAL Shipper      Box      Other     

Any "NO" responses or discrepancies should be explained in comments section.

- |  | YES      | NO          |
|--|----------|-------------|
| 1. Were custody seals on shipping container(s) intact? . . . . .   | <u>✓</u> | <u>    </u> |
| 2. Were custody papers properly included with samples? . . . . .   | <u>✓</u> | <u>    </u> |
| 3. Were custody papers properly filled out (ink, signed, match labels)? . . . . .  | <u>✓</u> | <u>    </u> |
| 4. Did all bottles arrive in good condition (unbroken)? . . . . .  | <u>✓</u> | <u>    </u> |
| 5. Were all bottle labels complete (Sample No., date, signed, analysis preservatives)? . . . . .                                   | <u>✓</u> | <u>    </u> |
| 6. Were correct bottles used for the tests indicated? . . . . .  | <u>✓</u> | <u>    </u> |
| 7. Were proper sample preservation techniques indicated? . . . . .   | <u>✓</u> | <u>    </u> |
| 8. Were samples received within adequate holding time? . . . . .   | <u>✓</u> | <u>    </u> |
| 9. Were all VOA bottles checked for the presence of air bubbles? (If air bubbles were found indicate in comment section) . . . . . | <u>✓</u> | <u>    </u> |
| 10. Were samples in direct contact with wet ice? . . . . . (NOTE TEMPERATURE BELOW)  | <u>✓</u> | <u>    </u> |
| 11. Were samples accepted into the laboratory? . . . . . (If no see comments)  | <u>✓</u> | <u>    </u> |

Cooler # 48-6201 Temp 5 °C      Cooler # 48-44 Temp 4 °C  
Cooler # 48-B182 Temp 4 °C      Cooler #      Temp 4 °C

Comments: Re Client request 3450W - SB7 belong with Project 3450W not 3557S for TPH Analyzes, not listed in C-o-c



**WADSWORTH/ALERT  
LABORATORIES**  
Sampling, testing, mobile labs

5910 Breckenridge Pkwy.  
Suite H  
Tampa, FL 33610

# Chain of Custody Record

(813) 621-0784  
Fax (813) 623-6021

Record \_\_\_\_\_ of \_\_\_\_\_

# 10093

Client: <b>ABB</b>		Project Name / Location: <b>NADEP PEN</b>		No. Of CONTAINERS	Parameter										Remarks
Sampler(s): <b>JAY KOCH</b> <b>PAM WAGNER</b>		Project #: <b>3450W</b>			VOC - 1/11/93	PAH -	METALS -	TRPH -	EDB -						
Item #	Date	Time	MATRIX	Sample Location											
1	1/15/93	1445	H2O	PEN-3450W-MW5	3	3									
2	1/15/93	1445		PEN-3450W-MW4	3	3									
3	1/15/93	1500		PEN-3450W-EB	3	3									
4	1/15/93	1520		PEN-3450W-MW3	3	3									
5	1/15/93	1550		PEN-3450W-MW2	3	3									
6	1/15/93	1600		PEN-3450W-MW1	3	3									
7	1/15/93			PEN-3450W-DUP	3	3									
8	1/15/93		V	*TRIP BLANK	3	3									
9	1/12/93	1200	H2O	PEN-3450W-MW10	3	3									
10															
11															

Total Containers

**27** 27

Number of Coolers in Shipment

**14**

Bailers

**14**

Report To:

**ROGER DURHAM**

Additional Comments:

- EDB samples do not have HCL preservative.

- LOI ANALYSIS ONLY.

- QUICK TURNAROUND FOR 3450W samples.

By **Marking (1/25/93)**

Transfer Number

Item Number(s)

Relinquished By / Company

Accepted By / Company

Date

Time

1

1-8

**Jay Koch**  
Alert Environmental Services

**Jay Koch**

1/19/93

10:15

2

3

4

5

6

Original Accompanies Shipment